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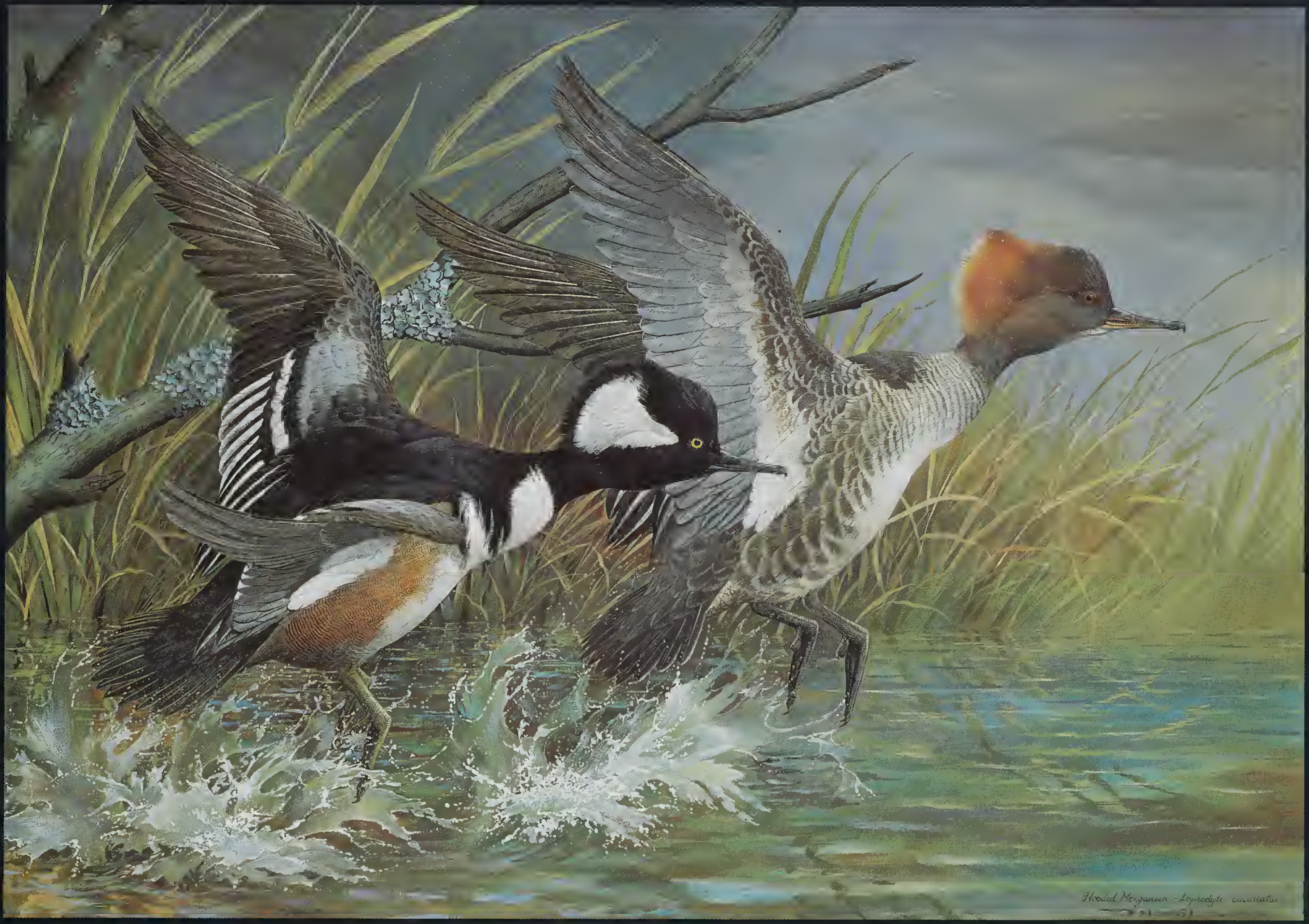
THE LIVING BIRD

Quarterly

Winter 1991



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THE LIVING BIRD *Quarterly*

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Front cover: Northern cardinal savors a juicy honeysuckle berry. Fruit-bearing shrubs will attract birds to your backyard without the fuss of filling feeders. On page 10, we tell you what and how to plant. Photograph by Maslowski Photo.
Back cover: Experts also recommend providing water to attract birds. Garden-variety birdbaths work best, but even an icicle will do, as this agile black-capped chickadee demonstrates. Photograph by Marie Read.
Right: The Cuban tody is often seen perched on low, open branches where it can sally out after insects and small lizards. The colorful bird nests in tunnels dug in a dirt bank. Photograph by Jerome A. Jackson.

FEATURES

10 **LANDSCAPING FOR BIRDS** *by D. R. Otis*
With a little forethought and the right plants, you can turn your backyard into a welcoming haven for songbirds.

18 **LIFE IN THE CONDO** *by Eugene S. Morton*
Yearling male purple martins may get more than they bargain for when they opt for group living.

22 **TOTEM BIRDS** *by Tom and Pat Leeson*
Mysterious carved birds once stood guard over Native American villages along the fog-shrouded Pacific Northwest coast.

28 **WILL-O'-THE-WISP** *by Jerome A. Jackson*
Researchers trace the shadowy trail of the ivory-billed woodpecker in the forests of Cuba.

34 **SKY DANCE** *by Aldo Leopold*
More than 40 years after his death, this famed conservationist's love of nature lives on in his evocative essays.

DEPARTMENTS

4 **159 SAPSUCKER WOODS ROAD**

5 **BIRDNOTES**

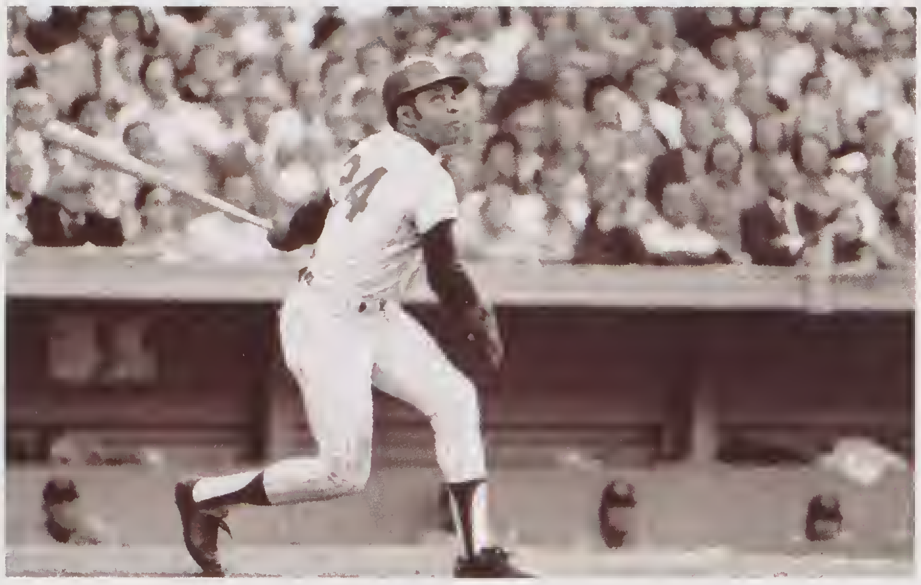
6 **IN THE FIELD** *by Jack Connor*
Birders beware! Nature-lovers are infiltrating your ranks.

8 **FLYING FIELD** *by Ted Williams*
At a rustic lakeside cabin in New Hampshire, so much depends upon the magic of phoebes.

36 **BEYOND THE FIELD GUIDE** *by Richard E. Bonney, Jr.*
The field of ornithology still relies on the work of experienced birders—amateurs who put their hobby to work for science.

38 **THE CATBIRD SEAT** *by Pete Dunne*
When it comes to big days, some heretical birders find creative ways to boost their bird lists.

p. 28 *Spicy Cuban specialty*



UPI/BETTMANN NEWSPHOTOS

Slugger Willie Mays keeps his eye on . . . a dunnelin?

GREETINGS FROM SAPSUCKER WOODS

When Jill Crane was hired as editor of *The Living Bird Quarterly* in 1981, the magazine didn't exist. It was an idea only, conceived by Lab of Ornithology executive director Charles Walcott and endorsed by the Lab's administrative board. Jill's mandate: create a popular magazine about birds that would inform, excite, and challenge Lab members.

Jill had several immediate obstacles. One was a lack of staff; another was a lack of writers. Finding writers for a nonexistent publication is no easy task! But find them she did, and Volume 1, Number 1 of the magazine appeared in the summer of 1982.

That issue was a triumph. It was only 24 pages long, but Jill had produced it virtually singlehandedly, editing all the words, locating all the photos, designing all the pages, even overseeing the printing as the sheets rolled off the presses. And that issue set the standard for 34 more that Jill would produce over the coming decade, acquiring several new staffers, many excellent writers, and a multitude of awards along the way. During those years all who worked with Jill came to know her for her high style, subtle humor, and unorthodox alternatives to the mundane.

But the last issue, Autumn 1990, was Jill's final bow as editor-in-chief. Last summer, after 10 years of toil, she decided the time had come to turn her cigar and green eyeshade over to someone else so she could pursue new interests. (Now Jill is working part-time for the Lab as an associate editor and studying photography in the time left over.)

And who is the someone else? With great pleasure I introduce Tim Gallagher, who arrived in Ithaca last September from southern California—his home for the last 17 years—with everything he cared about packed into an old Ford truck. Tim is an accomplished writer, editor, and bird photographer, and if you recognize his name, it may be from his many articles and photos in fellow bird magazine *WildBird*, of which he was the founding managing editor.

So welcome to Tim, who as editor of *The Living Bird Quarterly* promises to uphold the high quality that you're used to seeing in these pages.

Rick Bonney, Manager
Education and Information Services

Fowl Ball, Strike One

I've got two hobbies, birding and baseball. As much as I enjoyed Pete Dunne's article ("A Very Special Species," Summer 1990), I cringed when I read Willy [sic] Mays's name incorrectly spelled twice on one page. I suppose this error is akin to reading about "dunnelins" in a baseball magazine.

George Carrington Wood
Haverford, Pennsylvania

How could we have been so sillie?

Bad Call, Strike Two

In your story about conservationist John Sidle ("A Gift to Wildlife," Spring 1990) you wrote of "a region populated by hippo, water buffalo, elephant, topi, and cob."

Please, not the same error again. Water buffalo are in Asia. Our species is the African or Cape buffalo. I've lost count of the many times I've corrected visiting tourists!

Yvonne Malcolm-Coe
Nairobi, Kenya

Strike Three (They're Out . . . Here)

Three lashes of a wet feather to your geography teacher! Only in Newfoundland, you say, are piping plovers farther north than on *Îles de la Madeleine*. What about the hundreds of pairs nesting in the Canadian prairie provinces?

Readers may be interested to know that in the spring of 1985 the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assigned endangered status to the piping plover.

Winifred (Cairns) Wake
London, Ontario

You are right; however, our article concerned only the Atlantic *population of piping plovers.*

Macho Man or Mr. Mom?

The excellent article by David Westneat and Paul Sherman ("When Monogamy Isn't," Summer 1990) provides a scientific explanation for my own casual backyard observations of extra-pair copulation (EPC).

As the authors point out, the benefits of EPC for males appear pretty straightforward, but the benefits for females are more subtle. Let me pose a question. If EPC is a successful strategy for males, is it not in the female's interest to mix her genes with a male that exhibits EPC behavior, so that someday her own sons will enjoy similar breeding success?

I should probably stop this inquiry here, but it is tempting to pursue the matter further: As a female chooses among prospective partners, what is the optimal trade-off between paternal behavior and EPC behavior? Should a female select a male that performs one behavior, or a male that does both? Or should she choose two males, each robust in a different respect—thus not putting all her eggs in the same basket?

Nature's complexity is astounding. We who read of your work at Cornell can only express our thanks and appreciation.

Anthony Piel
Divonne, France

We welcome letters from readers. Write to:

The Editors
The Living Bird Quarterly
159 Sapsucker Woods Road
Ithaca, New York 14850

PEREGRINE FUND PHOTO

Tom Cade and friend

Falcon Fund Festivities

The Peregrine Fund marked its 20th anniversary of raptor research and conservation in September with a celebration at headquarters in Boise, Idaho. Over 1,800 people attended, enjoying tours, lectures, and cake.

When the Fund was established, the peregrine falcon no longer nested east of the Mississippi and was seriously threatened throughout North America. Since then almost 3,000 peregrines have been hatched in captivity and released, and populations have rebounded.

Director Tom Cade established The Peregrine Fund in 1970 at the Lab of Ornithology after concerned members of the public began sending unsolicited donations to the Lab "to help save the peregrine falcon." Working out of a custom-designed "hawk barn" in the Lab's Sapsucker Woods Sanctuary, Cade forged a unique alliance of ornithologists and falconers as he developed techniques for reintroducing captive-reared birds to the wild.

The highly successful project has grown over the years, and in 1984 The Peregrine Fund began construction on the World Center for Birds of Prey in Boise, Idaho. The Center became fully operational in 1986 and the Sapsucker Woods projects were moved there in 1988. Today The Peregrine Fund's mission has grown to include other threatened raptor species worldwide, including the Mauritius kestrel and harpy eagle.

Inland Oil Spills

Offshore oil spills are bad enough. But even landlocked birds aren't safe from the danger of oil-fouled waters. In the Playa Lakes region of the southwestern United States, the open pits and ponds in which chemical manufacturers store industrial wastes are luring hundreds of thousands of birds to a sticky death. The deceptively reflective surfaces of these pits attract many species of waterfowl and shorebirds as well as hawks and owls.

The Playa Lakes region encompasses parts of New Mexico, Texas, Colorado, Kansas, and Oklahoma. In this area, asserts U. S. Fish and Wildlife Service (USFWS) assistant regional director Tom Smylie, "we're losing more ducks to oil pits than are being taken by hunters."

USFWS requires landowners to cover their pits or pay fines of up to $5,000 per bird killed. New Mexico has responded with regulations requiring screening over all open pits, and today most of the pits in the state have been covered. Oklahoma and Texas are proposing similar regulations.

In the meantime, birds in those states still face a sticky situation. Recently five oil companies in western Oklahoma were fined for causing the deaths of 63 migratory birds.

Birders' Forum Supports Neotropical Research

Imagine birding without binoculars. It's a frustrating everyday reality for some Latin American researchers, who often lack the most basic tools for studying bird populations. Yet bird research in Central and South America and the West Indies is critically important.

To meet the need for equipment and funding, the Massachusetts Birders' Forum has been established by the Manomet Bird Observatory (MBO), a Massachusetts-based center for environmental research and education. The forum is a network of 18 bird clubs and MBO; its goal is to establish links with research, conservation, and education groups in Latin America. Initially the forum is collecting binoculars for distribution to Latin American groups; future projects may include sending field guides, reference books, and funds for research.

MBO is eager to work with other organizations throughout the United States to form similar networks. For information about how your bird club can be involved, or how to contribute to the Massachusetts Birders' Forum, contact: Birders' Forum Coordinator, Manomet Bird Observatory, Box 936, Manomet, Massachusetts 02345.

On the List

That a species has been declared endangered is hardly cause for celebration. But the speed with which the golden-cheeked warbler was listed last summer by USFWS under the emergency provisions of the Endangered Species Act certainly deserves notice.

Like so many endangered species, this tiny migrant is a victim of the creeping urbanization that turns solid expanses of forest into checkerboards of vegetation and asphalt. The nesting requirements of the golden-cheeked warbler can best be described as exacting: it's the only bird in North America whose breeding range is confined to the hill country of central Texas. There, in forests of oak and Ashe juniper, the warbler builds its nest from the bark of junipers at least 40 years old. Over the last two decades, as the bird's habitat was developed and fragmented, the number of breeding pairs declined steadily.

In a curious twist of fate, the federal government recently acquired several thousand acres of warbler habitat previously owned by now-defunct savings-and-loan corporations. These acres and other parcels are now being considered for possible designation as critical habitat for the species.

New Federal Support for Nongame Birds

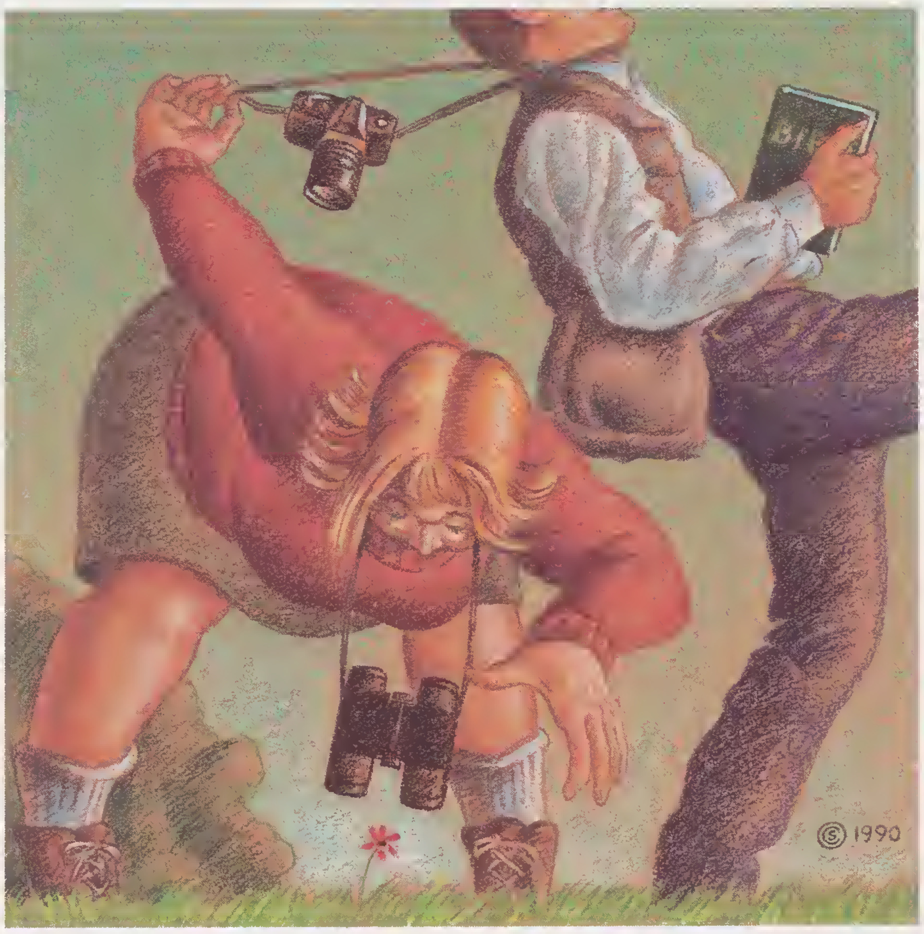
A recently published document reflects important advances in the federal government's commitment to bird conservation. *Strategies for Conservation of Avian Diversity in North America,* a USFWS publication, is a blueprint for monitoring, research, and management strategies for nongame birds in the United States.

Although 93 percent of our country's 836 bird species are considered "nongame," Federal and State agencies historically have made the 7 percent that are hunted—mostly ducks and other waterfowl—a priority. The new USFWS document recommends a million-dollar allocation for nongame research and management and gives the Service the role of coordinating all nongame monitoring efforts.

To receive a copy of the USFWS document, and to express your pleasure that the agency has at last made nongame birds a priority, write to: USFWS, Office of Migratory Bird Management, Mail Stop 634, ARLSQ, Washington, D.C. 20240.

SUBVERSIVES AMONG US

Jack Connor



STEVE CARVER

Have you noticed them? It used to be only two kinds of people came on field trips: the gung-ho birders up front, leading the charge, and the not-so-gung-ho birders following along in the pack—the stars and the audience, in other words. Not any more. Now there's a third kind of person tagging along, creating a sideshow and disrupting everything.

These subversives can fool you at first. They know how to pronounce "prothonotary," "pileated," and "*Empidonax*," and if someone spots a rarity, they'll get just as excited as everybody else. But they've all got grass stains on their knees and magnifying glasses in their pockets, and if you peek into the backseats of their cars, you'll see all kinds of misleading literature lying there—books by Lawrence Newcomb, Robert Pyle, Roger Conant, Olaus Murie, Annie Dillard, Sally Carrighar, Edwin Way Teale, and other heretics.

The first time I realized how much trouble we had in the ranks was a couple of Septembers ago when my friend Emmett and I were leading a field trip through the county park. I'll admit it was raining a little, and the winds weren't right for a fallout, but what does a committed birder do under adverse circumstances? You pick up the pace, right? You walk faster and look harder. You *run* if you have to. Emmett and I were both trying to crack the whip on this particular group. "Come on, let's go. Keep your eyes peeled, everybody. You never know when we might see something!" But the harder we pushed the slower they trudged. By the time Emmett spotted a phoebe perched in a tree less than a hundred yards away, the only person keeping up with us was one little boy in a Cub Scout cap.

I sprinted back down the trail to rally the rest of them and discovered the whole group clustered together staring into the bushes, oohing and ahhing. They sounded so excited I elbowed right through, thinking it was maybe a Connecticut or a Kentucky they'd surrounded, or at least a hooded, and right in the center of the crowd was this little old lady in a "Save the Snail Darter" sweatshirt. She was pointing toward the ground, and it was no warbler she'd found, or any other kind of bird. It was a *plant*—some kind of dinky blue flower with a crimped-together tip.

"Look," she said to me, "a closed gentian!" "Isn't it beautiful?" said someone else. "I've never seen anything like it," said a third.

Then *right there*, right in the middle of our bird walk, with me trying to tell them that Emmett was waiting at the Questar and the phoebe could fly away at any moment, the little old lady pulled out *Newcomb's Wildflower Guide*, someone else opened an umbrella to hold over her, and she knelt down in the dirt to give an impromptu lecture on how to separate one gentian from another by the shape of the leaves—and they all started nodding their heads like it mattered to them!

Luckily, I didn't have to explain this to Emmett. By the time I got back to him he was talking to the Cub Scout about his trip to Attu, and I knew he wouldn't want to be interrupted. He was up to the part where he describes how the tour he was on had the fifth North American record for rufous turtle-dove. It's an exciting story—at least the first few times you hear it.

When the rain started to pour, we stepped under a tree and waited. But it wasn't until *an hour and a half* later, just as Emmett was showing the kid his slides of his bunkbed on Attu, that our so-called birding group came marching up the trail, all smiles. "Hasn't this been a great trip?" said one. "I loved that gentian." "Can you believe that little old lady knows *all* the goldenrods?" said the next.

"And how about that fox track she found?" said a third. "I almost stepped on it and still didn't see it."

"And those tiger salamanders," said another, "how did she know exactly where to find them?"

Delays and disruptions like this have become more and more common in recent years. For a while, Emmett began all our field trips with an announcement: "This trip is a *bird* walk, folks, for *bird watchers* only. Anyone stopping to look at other stuff is on his own and will be left in the dust." But it didn't do any good. Some of these subversives are so arrogant they kept tagging along anyway. One time I tried to point out a Swainson's thrush up in a tree. "Which tree do you mean?" this know-it-all asked me, bold as brass, "the oak or the maple?"

All I could think was, if he weren't so busy showing off his knowledge of oaks and maples, maybe he'd be the one finding the Swainson's.

Some of these people don't even call themselves birders any longer. They're "naturalists" they say, and you never know what they're going to stop to look at next. In fact, *they* don't even know! Birders go after birds, right? And if we don't find any birds in the first place we look, we don't let that stop us. We just drive somewhere else and look there. We're focused and dedicated—and we know how to concentrate hard enough to find just what we're looking for. These "naturalists" don't seem to care *what* they find. To them, a frog is as good as a finch; a newt can be better than a nighthawk.

Apparently, it was even worse in the old days. Back in the Dark Ages, before you could buy a mirror lens or take a guided tour to Antarctica, bird watchers who studied ferns or chased after dragonflies weren't considered as flakey as we know they are today. My theory is it probably had something to do with the lousy optics they had in those days. If your bins are so bad you can't tell one race of short-billed dowitcher from the others, you might as well give up and start looking at the horseshoe crabs. The lack of cars and superhighways probably hurt too. Since most people couldn't pack up and drive a hundred miles whenever they felt the birding urge come on, they had to settle for whatever there was within walking distance. When they ran out of new birds to find, they had to start paying attention to whatever was left over: flowers, trees, mushrooms, caterpillars, beetles, tadpoles, turtles. It must have been a pretty dreary time.

Don't ask me why, but now it seems a lot of people are so blind to the joys of serious birding that they're intent on going back to those primitive days. Field trips take longer and longer; bookstores are filled with field guides to spiders, seashells, the solar system, and other trivia; and people's interests get stranger and stranger. Last spring Emmett and I walked up on some guy turning over rocks in the trail. "What are you doing?" Emmett asked him. "Looking for herps," the guy said. I told him the last time I caught herps it was from staying too late at the junior high prom—and then the guy looked at me like *I* was the weirdo!

Emmett called me one day last October. "Get over here quick! I've got a lifer in my backyard!"

The only place I dropped below fifty on the way over was when I cut through the mall parking lot to beat the light at the corner. I was pretty excited. Emmett's North American list is 691, and I couldn't remember the last time he'd found a life bird without having to charter a jet first.

"He's out back," his wife told me after I screeched to a stop in their driveway, "in my wildflower garden." Yeah, Emmett's wife keeps a wildflower garden, and she's a bad influence. I forgot to mention a lot of the worst subversives are the spouses of birders.

But still I didn't realize what had happened until I ran around the house and saw Emmett down on his knees next to the compost pile with a magnifying glass in his hand. I started to back away, but it was too late. He saw me and pointed. "It's a question mark," he said, smiling so wide you'd think he'd just woken up in Paradise. "See all that purple edging on the hindwings? I read in Pyle that means it's the fall form. Isn't it beautiful?" ☐

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DONNA WILLIAMS

TO BE CHOSEN BY PHOEBES

Ted Williams

The birds of Big Island Pond make fishing meaningful.

Directly above the glowing, green monitor of my ancient Apple and two feet beyond the open window is a long, scraggly pine bough—the favorite perch of my camp phoebes. The female alights there with an enormous dragonfly held crosswise in her mandibles. I had watched her flutter out over the calm lake surface, wheel, and hawk it as it hawked gnats.

Now she is so close I can see the flycatcher whiskers around the base of her dark bill. As she puffs her elegant gray and white plumage and struggles with her meal, her slightly larger but otherwise identical mate touches down on a higher branch, assumes his jaunty, erect posture, raises the crest on his oversized head, pumps his tail, and chips. At this time of year he sings mostly in the predawn, and on occasion she does, too.

Their harsh, raspy *fee-bee* pales beside the chickadee's sweet, plaintive rendition. But as my fellow Yankee curmudgeon Robert Frost put it, "we love the things we love for what they are." I am never sure if my phoebes wake me or if I wake to hear them. In any case, they are always the first birds I notice, if you don't count whip-poor-wills and owls. Twenty years ago I had shown their great-grandfather or maybe great-great-grandfather where I wanted the nest by nailing a board under the eaves above the outside light socket, and he (like all his male issue ever since) had shown his lady by hovering and chattering.

Such scenes are infinitely more interesting to me than what is happening on my computer screen. They remind me how important my camp phoebes are, and how they helped straighten the rambling worm trail of my life.

Phoebes held no fascination for me in 1954 when, at age eight, I helped build the camp. Part of my job was fetching bricks in the wooden rowboat from the ruined mansion of New Hampshire's first governor, Benning Wentworth. Maybe these artifacts from the wild, forgotten north end of the island helped the phoebes choose the new camp or, more likely, they had nested in the dilapidated one it replaced. Whatever drew them, their acceptance of the raw, unweathered building was a monumental compliment to my grandparents.

To be chosen by phoebes . . . now I understand what it means. Phoebes never choose the vinyl-sided houses lit by blue moth zappers ("homes," the chop-and-plop developers prefer to call them) that sprout in clear-cuts along the mainland shore and are named after what they have destroyed—"Lakewood Estates," "Hemlock Heights." They choose instead the spare, non-multiplying Yankee camps on Governor's Island—always (save in my grandparents' case) after the pines have bulged around the hammock hooks, raised the shingles with their discarded needles, and provided enough shade and dampness to rot the sills a little, after the false lily-of-the-valley has marched beyond the pump house, after wintering red squirrels have gnawed the window mullions and at least two generations of boys have traced bass, pickerel, and trout on smoke-stained cupboard doors.

More interesting than how phoebes react to humans is how humans react to phoebes. My grandmother—Grammy—was repulsed by the droppings on the porch steps and, as a rite of spring cleaning, brushed the nest from the light. To the matron of the camp it was just a mass of mud, moss, grass, and pieces of my fishing line, but to the matron of the eaves it was a masterpiece that sometimes took two weeks to sculpt.

Half a mile south, Aunt Marney knocks her phoebe nest from the doorjamb each spring, not because she is tidy but because "there have been so many tragedies with the cats." Still farther south, at The Point, my friend Betty saturates her porch with mosquito poisons, thereby killing her nestling phoebes and making life a little easier for several hundred generations of mosquitoes yet unborn and with whom she will cohabitate until September. It's not that these ladies don't love and appreciate nature, it's just that they are the products of another age. In many ways my wife and I and our two children view the natural world from their shoulders.

Yet it never ceases to astonish me how that age could have stockpiled so much information about individual species and so much tommyrot about the way they interact with each other. In 1927, for example, the celebrated ornithologist Edward Howe Forbush was able to write in *Birds of Massachusetts and Other New England States* that the phoebe's "only known harmful trait is the occasional destruction of a few fish fry. It [therefore] well deserves all the protection it usually receives at the hands of man." From this it follows that the ospreys, loons, cormorants, mergansers, herons, and kingfishers, all of which dine almost exclusively on the ever-prolific fish of Big Island Pond and all of which make my fishing joyful and meaningful, deserve to be excised from the planet.

When Grammy became too old to clean, the phoebe nest no longer was removed. Instead, the eggs got hardboiled when people forgot to leave the light turned off. In the spring of 1970 the nest crashed to earth after I had broken the bond by loosening the bulb. That's when I nailed up the nesting platform and hid the bulb in the darkest recess of the cellar, where it reposes to this day. "Stolen," I truthfully told Grammy when she asked me where it was.

Now the first thing we do when we arrive at camp—even before unloading the car—is check on the progress of nest or clutch or hatchlings. Once, when we arrived on a fine, gusty afternoon in mudtime, the nest was empty. The next morning, at first light, there was one egg. And one more each morning thereafter until the clutch was complete at five. It's impossible to see the eggs from the porch steps, even if you stand on tiptoe, but I can feel them, and I do see the empty shells. The eggs are pure white, although a few (usually the last laid) have brown spots on the large end.

Even without cats there are tragedies. One summer when the blueberries were ripe and the soft lakeside air was heady with the fragrance of sweet pepperbush, I found the second brood dead on the steps, each tiny, naked corpse swarming with red mites. I removed the infested nest and sponged the board, but "Mrs. Phoebe," as the kids call her, didn't rebuild that year. And once, in the tumult of his youth, Ruggles the Brittany spaniel broke point and gummed to death a brace of fledglings. Still, the board is solid and secure, a relatively safe nesting site. When the first dab of mud appears we lock the south door and use only the north door until the second brood has taken wing. From my porch cot—in those last, delicious minutes before I rise and stumble with my fly rod to the canoe—I love to watch the busy parents helicoptering up and into the nest and listen to the greedy shrieks of their young.

LEONARD LEE RUE III

Sometimes when I cut the brush that tries to reclaim the camp as if it were Sleeping Beauty's palace, or when I trim back the clutching hemlocks that rot our sills more than just a little, I feel the phoebes watching me. I think that maybe this time I won't pass inspection and they will choose someplace else.

I was sure that I had failed five years ago when I arrived for the first time since ice fishing, alone and late. I pulled Grammy's old leather chair up to the governor's reassembled fireplace, touched off the dry pine logs, and contemplated the framed, autographed passage on the wall. The words were composed by friend and mentor John Voelker (a.k.a. Robert Traver), author of *Anatomy of a Murder* and the superior work from which they were taken, *Anatomy of a Fisherman:* "I fish because I love to; because I love the environs where trout are found which are invariably beautiful, and hate the environs where crowds of people are found, which are invariably ugly . . . because only in the woods can I find solitude without loneliness; because bourbon out of an old tin cup always tastes better out there . . . ."

"How true, John, how true," I said, taking a long pull on my third cup of bourbon. With that, my thoughts turned to the camp phoebes. I wondered if they had an egg yet, so I walked unsteadily to the porch, opened the door, and felt around. To my horror, Mrs. Phoebe already was on the nest, incubating. When I touched her silky back she cried out and fluttered onto the porch and thence into the living room. At least I had the presence of mind to throw the screen over the fire.

She did not fling herself hysterically against the windows and walls as so many birds will do. Instead, she fluttered and hovered, soundlessly, like a moth. I ushered her out onto the small back porch, closed the kitchen door, and caught her in my cupped hands against the screen. She didn't struggle, scream, or peck, but her eyes were quick and wild and her breast heaved.

I took her out into the cold, black night and held her a long time against the pine needles, stroking her crest, waiting for a shaft of moonlight through the clouds. Peepers jangled from the swamp across the lake and toads trilled from the fire pond on the hill. At last the moon broke through, racing over our rippled cove, up into the lacy birch catkins, onto the roof and, finally, to the tops of the sentinel pines. I left her then and retreated into the camp where I spent a long and restless night.

But at dawn she was on her nest. Even in the face of such an insult I remained the undeserving recipient of her trust and approval. I felt the way I had in the spring of 1969 when, after reading none of a dozen books and having gone fishing and drinking for the previous three days, I passed my advanced philosophy final because the single question had been, "Explain your own philosophy."

Every spring I can't quite believe it when our phoebes choose us again. They are spirits that waft out of old, stone wall-laced forests to hover around old waterside buildings of precisely the right sort. Maybe they are the spirits of dead fishermen who drank and laughed and played cribbage there and who loved the lake or stream. Anyway, I thank God that there still are plenty of phoebes. Without them our place would be deprived of memory and magic, and we would be disowned. To be chosen by phoebes means that you are not a blight upon the living Earth, that, finally, you are almost decent and acceptable, and that, even considering your species, there is hope for you. ☐

Ted Williams—whose baseball career ended, as he puts it, "permanently and mercifully" in junior high school—has written full-time about wildlife and the environment for 20 years. In 1990 he was chosen by the American Society of Magazine Editors as one of five National Magazine Awards finalists for his reporting on the Yellowstone fires in *Audubon*; and in the same year he was named to "the Circle of Chiefs"—the top conservation award of the Outdoor Writers Association of America.

LANDSCAPING FOR BIRDS

D. R. Otis

Put out the welcome mat for songbirds

Almost every day I walk through my neighborhood doing errands. The houses are old, the trees big and healthy, so in summer most streets are lovely green tunnels. As I stroll past, I like to look at people's yards. Two properties in particular always catch my attention. Both have large, handsome brick houses on quarter-acre lots, but there the similarity ends. The yards reflect opposing philosophies of landscaping. One is a lush habitat thronged with flying, feeding, and singing birds. The other is sterile, with little to offer birds or the eye of a passerby.

The property the birds favor is bounded by old barberry hedges, grown wide on top, with a dense tangle of twigs underneath where small birds congregate. Scattered about the yard are clusters of trumpet vine and juniper, crab apple and dogwood, currant and viburnum. Boston ivy climbs the house walls, adding a brilliant touch of scarlet in autumn. A bird feeder stands alongside a voluptuously intertwined grapevine on an arbor. The back of the yard is a jungle of undergrowth where Virginia creeper and poison ivy grow, their berries attracting pileated woodpeckers and other birds. A massive mulberry stands in a corner, drawing flocks of songbirds in the years it fruits heavily. This small property has almost everything a bird needs. It also has much to offer from a human standpoint. The intimate lawn area with its two chairs looks inviting. It would be a delightful place to sit and read the Sunday paper.

The other yard, just a few blocks away, is a rectangle enclosed by a cast iron fence. Eight huge maples stand in a grove near the house, the ground beneath them covered with a sea of white gravel. The only other woody plants are a few groups of yews trimmed so tightly that a bird would need its own electric hedge trimmer to get inside for cover. The lawn extends in immaculate monotony from house walls to iron fence. There are no flowers, no shrubs for cover, and few berries or seeds. Walking around this yard would not be interesting; there's nothing enticing about it, for birds or people.

The first yard illustrates two basic points about bird gardens. First, to attract birds you must provide the things they need to survive, such as food, water, and shelter. Second, bird gardens can be as attractive to people as they are to birds. Don't imagine that by landscaping for birds you must sacrifice beauty and the sense of refuge you expect from a garden. It's true that overly formal gardens, such as the manicured confections of Versailles, lack bird appeal, but unless you're a king or queen you probably won't want to plant triangular beds of 5,000 red tulips anyway. Bird-friendly plants can meet the requirements of every other style of garden.

In fact, if birds could create their own gardens they would follow many of the principles that guide human garden design. The birds would choose a wide variety

MASLOWSKI PHOTO

Hawthorn berries are winter food for songbirds such as this cedar waxwing (left). A goldfinch (right) hangs upside down to reach tasty sweet gum seeds.

MARIE READ

of plants—evergreen and deciduous, large and small, trees and shrubs, woody and herbaceous. They would favor plants that flower and produce fruits, berries, nuts, or other seeds. Nonmigratory birds would emphasize plants that carry fruit into winter. The bird garden would have few straight lines; hedges and shrubby areas would meander in and out of the lawn. The birds would grow vines up the house walls. Many would prefer rich, lush, wild growth, which, for the human gardener, means less time fussing over the garden and more time enjoying it.

The birds would also urge you to get started soon. Most ornithologists agree that habitat loss, degradation, and fragmentation are the principle causes of bird population declines. Forest areas in particular have faced massive destruction in recent years. Your bird garden can help provide suitable habitat for displaced birds.

GREGORY K. SCOTT

A dead tree left standing will attract chickadees and other insect-eaters that forage for grubs.

To begin the process of transforming your property into an attractive haven for birds, carefully survey your yard. Try to assess what factors might be holding down the number and variety of birds you attract. Be logical and systematic. Evaluate the strengths and weaknesses of your current landscape arrangement. If you already have tangled thickets in your yard, then the birds' requirement for escape cover and secluded resting places has probably been met. In that case you might want to concentrate on providing more food sources, such as berry-producing trees. If water is absent from your property, install a birdbath.

How far you go with your landscaping will depend on the extent of your property and your ambitions. If you're considering a complete overhaul or landscaping a new house, measure your house, outbuildings, sidewalks, and the trees, shrubs, and other features you want to keep. Plot their locations in a scale drawing on graph paper. Then try various layouts on tracing paper laid over the scale drawing.

The next step is to choose the best plants for your garden. Nursery catalogs and the reference books mentioned in the sidebar on pages 14 and 15 are helpful. As you make your choices, consider what the plants will be like when they mature and whether your garden can accommodate them. A six-foot oak sapling may look dandy, but you'll be less pleased with it when the branches spread 50 feet wide and fill your entire property.

Take some time to figure out the unique needs of your yard. How will your family use the garden? Do you want shade? Will your children need an open area to romp around in? Do you intend to install a barbecue or picnic table? Good designs consider all the varying demands that will be made on the space.

Also, be aware of the context of your yard. If you live next door to Joe's Dogwood Farm, you probably won't want to plant another dogwood. Walk around your neighborhood and see what appeals to you. Take note of what the local birds lack and what they already have in abundance. Try to choose plants that will address more than one of the birds' needs. Many plants, for example, offer good cover and good fruit.

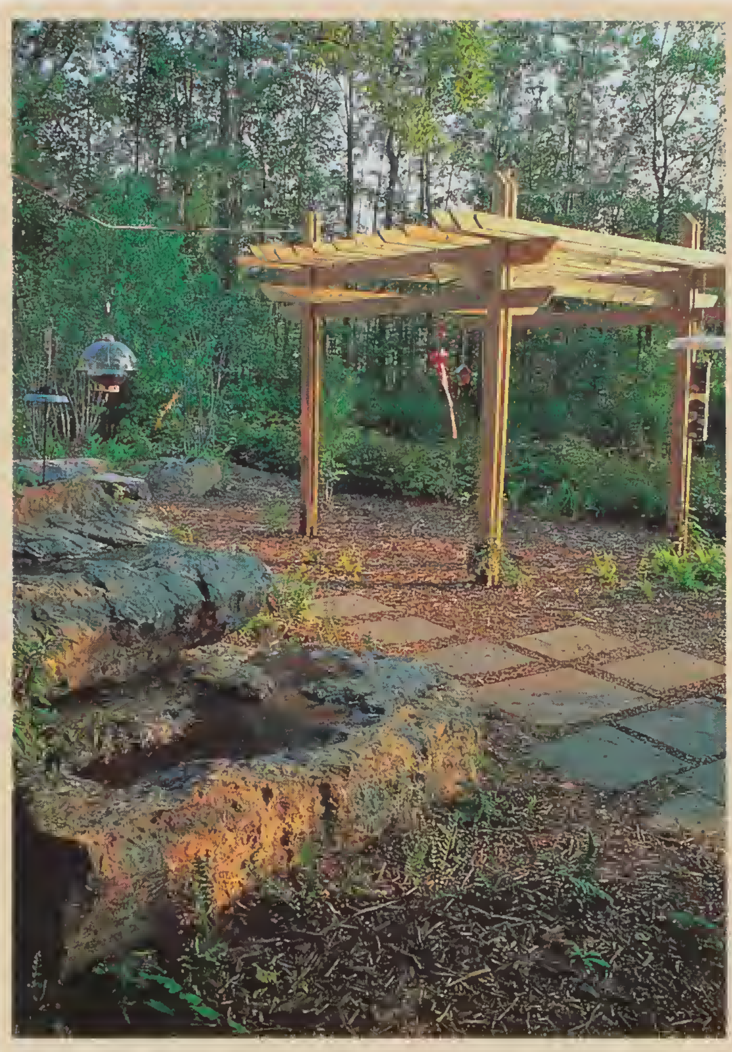
As you assess trees and shrubs for your habitat, remember that it's a rare plant that doesn't provide at least some benefit to birds. Orioles weave milkweed fluff into their nests. In winter, mockingbirds and cedar waxwings eat the seed-bearing hips of hybrid tea roses. Squirrels eat tulip bulbs, red-tailed hawks eat squirrels. Most plants attract pollinating insects to their flowers, and many birds eat pollinating insects. For the bird landscaper, the question is not which plants benefit birds, but which plants will best help to construct a complex, nourishing habitat where birds can flourish throughout the year.

Like people, birds enjoy diversity. Plant a variety of species. Avoid monotonous straight rows. Think of lawn as ocean and try to create a complex, dramatic, yet harmonious shoreline of plants. Develop secluded coves, peninsulas of shrubs, mountains of conifers, islands of mixed plantings. Let the entire garden not be visible at once. Conceal part of it behind, say, an outcropping of serviceberry and viburnum. A varied, meandering "shoreline" will help you to maximize edge—where two types of habitat such as lawn and a shrub border come together. Birds favor edge because it offers the broadest range of perches, food, and nest sites. By weaving the thicket border in and out of the yard you can easily double the length of edge you provide. On your scale drawing, try out different edge schemes by moving around a piece of string or a fine chain. (The same thing can be tried in the yard itself with a hose.) A design that seems good on paper will look good on the ground as well.

Don't plant trees with messy fruit in areas where they will stain cars or pavement. And don't plant trees where roosting birds' droppings will fall on your car. Keep trees away from your house; their branches can damage your walls and roof during storms, and the fallen leaves will clog your gutters. Find out the mature breadth of a tree's branches and then plant it at least half that distance away from the house.

Note where your yard gets sun and shade. No matter how gorgeous a plant may be, or how popular it is with birds, if your reference books say it needs all-day sun, don't put it in a dark corner. Even in a bad location, a plant will often struggle along for a few years, but a shade-tolerant plant would look nicer, be healthier, and serve birds better. Also, don't create shade problems for yourself. Put taller trees on the north side of your property where they won't block your sun.

If you are buying and planting by yourself rather than hiring a landscaper, take on no more than you can handle. The planting season is short, and digging holes is hard work. Newly planted trees and shrubs need more attention than you'll want to give if you're exhausted. Spread your planting out over several years, installing major design elements first to get them started.



MARIE READ

The Quintessential Bird Garden

The first thing that catches your eye as you enter the Cornell Lab of Ornithology is the vast wall of picture windows along the back and sides of the observatory. The windows invite viewing. Scanning the panorama outside, your eyes pass across the pond and the picturesque woodlands until they come to rest on the bird-feeding garden at the left side of the observatory.

What would you expect to see in a bird-feeding garden at the Lab of Ornithology? A focal point of beauty and interest for visitors? A showcase of the best plants, feeders, and landscape design to use in a bird garden? Until recently, the answer would have been a resounding "no!" What you'd have seen was a goose-ravaged wasteland where only the most tenacious plants survived. Three pathetic-looking yew shrubs stripped clean of foliage up to full goose height, several mulberry trees in various stages of decline, and a drab ground covering of flagstones and gravel spattered with goose droppings would have greeted your eyes. Looking up you'd have noticed an army of squirrels crawling freely across the feeders, taking more seeds than the birds. And the birds most likely to be seen would have been house sparrows and starlings. The bird-feeding garden was, in short, a mess.

In 1989 Scott Sutcliffe, Charles Smith, and other Lab staffers got together to brainstorm and figure out exactly what it would take to turn this eyesore into a bird-feeding garden the Lab could be proud of. They drew up a list of plants most useful for birds. The idea was to use a variety of native New York plants that would provide birds with all their basic needs in food, shelter, and escape cover throughout the entire year. In addition, the new feeding area was designed to be a place where Lab visitors could observe songbirds up close in a picturesque garden setting.

The major task of designing the bird feeding garden went to Marvin Adelman, a landscape architect at Cornell University, who drew up the initial plans and sketches, and followed the project through from beginning to end. Charles Treman, a life member of the Lab's administrative board, generously offered to donate the bulk of the money needed to create the new garden, with the Agway Inc. Country Foods Division and Agway Foundation contributing the remainder of the funds.

The transformation began last spring and lasted six weeks. It was fascinating to watch. First came workers with tractors, who ripped out all the old vegetation. Then dump trucks brought in huge mounds of earth. Bulldozers attacked the ruler-straight pond edge along the front of the observatory, replacing it with a curvaceous new shoreline that is nicer to look at and more accessible to waterfowl. Blocks of limestone from a local quarry showed up next; and for two days a man with a mini-jackhammer chiseled a beautiful birdbath and waterfall from their centers.

Next began the actual planting. Every day something new appeared: serviceberry, which provides fruit as early as May and June; bush honeysuckle, offering flower nectar and fruit; cinnamon fern, a source for hummingbird nesting materials; birch, bearing fruit in the late summer and early autumn; winterberry and highbush cranberry, with fruit to sustain birds through the harsh winter months. And along with the plants came the finishing touches: a path of stepping stones surrounded by bark mulch; an arbor with trumpet vine and feeders to attract hummingbirds; a new, more squirrel-resistant setup for hanging seed and suet feeders. Finally, black-locust posts were set around the songbird garden to keep the local Canada geese from walking in and ripping up the new plants.

Since the garden was completed last spring, an array of songbirds has descended on it. Already a greater diversity of species is visiting than did previously. And, the garden has become the showcase for Lab visitors that we hoped it would. One of the major goals of the project was to create a backyard effect so that visitors would be inspired to create similar landscape changes on their own properties. It looks like the idea is working well; people frequently inquire about the identity of particular plants in the garden and ask where they can get them.

Of course, not everyone can put the same amount of time, effort, and money into designing and building a bird garden as the Lab of Ornithology did, but with careful thought and planning, you *can* make a major improvement to your yard as a habitat for birds. The accompanying article should help to get you started. —T.G.

ENTHEOS

Newly landscaped, the Lab's garden (left) is now more attractive to birds and people. Above, wildflowers will grow from seeds dispersed by birds if a patch of lawn is left untended. Here an Oregon junco perches next to wild mustard.

American robin with mountain ash berry by Tim Fitzharris

CHOOSING THE RIGHT PLANTS

Anyone trying to create bird habitat must eventually ask two questions: Where can I get plants? Which plants are best for my property?

The most accessible (and expensive) sources of plants are local and mail-order nurseries (see Plant Sources). Buying plants by mail gives you access to a huge range of choices, so you can select precisely what you need. Be sure that plants you order are hardy in your area.

A second option, albeit a controversial one, is to dig up wild plants. Many conservationists argue that plants should not be taken from the wild unless they're about to be destroyed ("Consumer Universe To Be Erected On This Site"). Surely we who are trying to create habitat in one place should not do so by impoverishing habitat someplace else. I would exempt one category of plants, however—those that are so ubiquitous, so clearly in no danger of becoming uncommon, that even the most ardent purist could condone collecting them. Examples from my own region are the red cedar, which covers abandoned fields by countless thousands, and the Virginia creeper, whose vines festoon trees and hedgerows everywhere along country roads. Before collecting, *always* get the landowner's permission.

The best time to dig wild plants is early spring, after the ground has thawed but before trees leaf out. Don't try to move anything bigger than a couple of feet tall. You'll be trying to dig up all the roots intact, along with the soil that surrounds them. It's hard work. You'll need a shovel, loppers or hefty pruning shears, and perhaps a small saw. Replant the tree promptly and keep it well watered while it's reestablishing itself.

The third source of plants is the slowest, but to my mind the most fun — propagating them yourself, either from seeds or cuttings. The seeds of many woodland plants, whether collected or purchased, require a treatment known as stratification before they will germinate, but don't let that intimidate you. Stratification usually entails nothing more than mixing seeds with damp peat moss in a plastic bag and putting them in your refrigerator for a few months. A cutting is simply a short twig or shoot cut from a plant at the correct time of year, which varies from species to species. The lower leaves are stripped off, the base is dipped in a hormone preparation (available in plant and garden stores), and the cutting is stuck in a pot filled with moist sand or peat. A clear plastic bag is fastened over pot and plant to make a tiny greenhouse. Most cuttings root within a few months.

However you decide to obtain plants, your choices will be determined by your budget, your preferences, the size of your property, and the local climate. The following list includes a few good choices for temperate areas of the United States.

CONIFEROUS TREES

RED CEDAR (*Juniperus virginiana*). Usually 50 to 90 feet, but often shorter. Attractive cone-shaped tree that carries its fruit into winter and offers cover and nest sites. Many cultivated varieties (cultivars) of differing shapes, sizes, and colors are commercially available. Shouldn't be planted near apples, quinces, or hawthorns, which are alternate hosts of a rust disease.

SPRUCES (*Picea* species). Up to 150 feet, but dwarf cultivars are available for smaller properties. This genus includes the popular blue spruce. Cones produce seeds eaten by birds in fall and winter. Provides good cover and nest sites. Tends to lose lower branches in shade.

DECIDUOUS TREES

MULBERRIES (*Morus* species). Wide-spreading medium-sized trees, 30 to 60 feet tall, depending on species. Smaller pendulous-branched "weeping" forms are available. Not universally appealing—lacks attractive flowers, and the blackberry-like fruits are messy. On the other hand, the berries produced in July and August are a favorite food of more than 40 bird species. Perhaps best for large properties.

DOGWOODS (*Cornus florida* and other species). Up to 40 feet. The well-known ornamental tree, covered with white, pink, or red flowers in spring and red fruits (birds love them) from August to November. Attractive fall foliage. An excellent choice, for birds and people.

CRAB APPLES (*Malus* species). Mostly about 20 feet. Pink or white flowers in spring; yellow, red, or purplish fruit throughout winter. Flower buds, flowers, fruit, and seeds eaten by many species. Good cover and nest sites, too. The cultivar "Bob White" is among those recommended for winter bird food.

SERVICEBERRIES (*Amelanchier* species). Small or medium-sized trees, 25 to 60 feet. Masses of white or pinkish flowers for a brief time in spring, fruits in summer. Wyman says the berries aren't an ornamental asset—the birds eat them too fast.

SHRUBS AND VINES

NORTHERN BAYBERRY (*Myrica pensylvanica*). To 9 feet. This semi-evergreen shrub grows well in coastal and swampy areas. The fragrant berries, which stay on the plant year round, are a preferred food of tree swallows, catbirds, bluebirds, and many other species.

STAGHORN SUMAC (*Rhus typhina*). To 50 feet, but usually much smaller. A common shrub or small tree that reproduces with runners—plant one and soon you have a grove. Brilliant red fall foliage and clusters of hairy red fruits that persist throughout winter, when they are eaten by many bird species.

VIBURNUMS (*Viburnum* species). 3 to 30 feet, depending on species. Mostly 6 to 9 feet. A large genus of easy-to-grow shrubs with white, sometimes fragrant flowers in spring, followed by red, yellow, blue, or black berries. Birds eat the berries and find good cover among the branches.

WILD GRAPES (*Vitis* species). Climbing vine. Superb source of fruit eaten by more than 50 bird species. Will smother shrubs and small trees, but in so doing creates excellent cover and nest sites. Climbs by tendrils; fruits in late summer and fall. Likes sun.

VIRGINIA CREEPER (*Parthenocissus quinquefolia*). A tree-climbing vine that produces small blue berries from August to February. Brilliant scarlet foliage in autumn. Easily grown on an arbor.

Many annual and perennial garden plants also benefit birds—consult Kress (see Further Reading) or other wildlife gardening books for recommendations.

PLANT SOURCES

An excellent resource for the bird gardener is *Gardening by Mail: A Source Book*, 3rd ed., by Barbara J. Barton. (Boston: Houghton Mifflin Company, 1990.) The index lists sources for everything a gardener could possibly need, including nurseries specializing in native plants categorized by region: Northeast, Southeast, Midwest, Rocky Mountains, Northwest, Southwest, and California. Also lists dozens of bird supply sources.

CATALOGS

Mellinger's, 2310 W. South Range Road, N. Lima, Ohio 44452 – 9731. Good variety of bird plants. Inexpensive. Also offers bird supplies. Free catalog.

Gurney's Seed and Nursery Company, 100 Capitol, Yankton, South Dakota 57079. Inexpensive bird-attracting trees and hedge plants. Free catalog.

Wayside Gardens, 1 Garden Lane, Hodges, South Carolina 29695 – 0001. Expensive, but reliable. You can call their staff horticulturist toll-free for advice. Beautiful full-color free catalog—a good resource for judging the appearance of plants.

Greer Gardens, 1280 Goodpasture Island Road, Eugene, Oregon 97401 – 1794. Expensive, but offers (in addition to a huge variety of rhododendrons) many excellent varieties of bird plants, including 21 types of dogwood. Catalog $3.00.

FURTHER READING

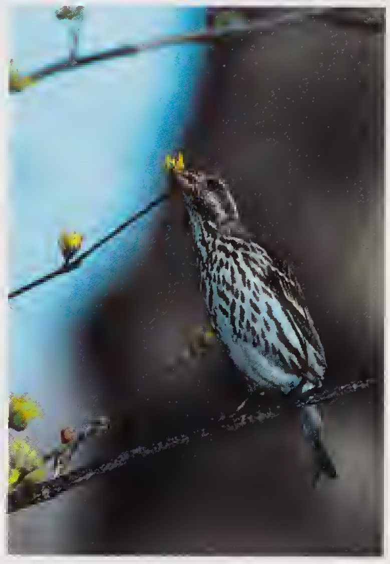
Wyman, Donald. *Wyman's Gardening Encyclopedia*, 2nd ed. (New York: MacMillan, 1986.) A comprehensive gardening resource covering nearly every plant species widely cultivated in North America. Discusses propagation techniques. Unfortunately there are few illustrations.

Taylor, Norman. *Taylor's Guides*. (Boston: Houghton Mifflin, 1987.) A ten-volume series with volumes devoted to trees, shrubs, perennials, annuals, and garden design, among other subjects. Nearly every species and cultivated variety discussed is illustrated with a color photograph.

DeGraaf, Richard M., and Gretchin M. Witman. *Trees, Shrubs, and Vines for Attracting Birds: A Manual for the Northeast*. (Amherst: University of Massachusetts Press, 1979.) Illustrated with line drawings. Describes 160 plants, gives flowering and fruiting times, habitat requirements, and propagation techniques. Lists which birds use the species for food, for cover, and for nesting.

Kress, Stephen W. *The Audubon Guide to Attracting Birds*. (New York: Scribners, 1985.) A comprehensive guide to attracting birds. Covers plant selection by region of the United States, pools and ponds, nesting structures, and feeding. Exhaustive reference lists for those seeking further information.

Henderson, Carrol L. *Landscaping for Wildlife*. (Saint Paul: Minnesota Department of Natural Resources, 1987.) Covers landscaping of yards, farmlands, and woodlands for wildlife with an emphasis on the Midwest. Extensive checklists provide data on a large variety of trees, shrubs, and herbaceous plants.


GAY BUMGARNER

Even flower petals can be bird food. A female purple finch (above) feeds on a dogwood blossom.

How much time do you want to spend on upkeep? You'll have to cut back dead branches, rake leaves, mow the lawn, and spread fertilizer. If you dislike yard work, check your references for low-maintenance trees and shrubs.

Local nurseries often have a limited selection. If you can't find what you want, get plants from a mail-order nursery, some of which offer a tremendous variety of plants. Don't worry if you order from a nursery in a different hardiness zone. Plants that are hardy in your region will adapt to your climate by winter if you plant them in the spring.

Most people will want a central open area as a stage for viewing the beautifully complex borders. But there are much better choices than lawn if you're trying to create a good bird environment. Many birds are uncomfortable in open lawn areas. If you do include a grassy area, make it no bigger than you need. Remember, a small lawn means less time cutting grass. To get rid of excess lawn, simply stop mowing it. Unless you've been exceptionally diligent at weeding, the resulting plot of tall grass should include some wildflowers. If birds perch nearby, seeds cast in their droppings will produce precisely the type of plants birds like, and in a few years you'll have a jungle of raspberry, pokeweed, and pinchberry.

A wildlife garden is toward the natural, lightly managed end of the garden spectrum; you will not want to drench your lawn or other plantings in chemical pesticides. Since you will be relying largely on native species, pesticides should not be necessary. Birds like pests; they eat them.

If infestations do occur, attack them without chemicals. Japanese beetles can be lured to traps, and milky spore, a fungus preparation, will kill their larvae in the ground. Or pick them off by hand. Try companion plantings — some gardeners contend, for example, that planting garlic will protect nearby plants from insect depredations. If you must spray, use a mild insecticidal soap that destroys common problem insects such as scale, aphids, and spider mites without causing great harm to the bees and other pollinators that are needed to ensure that your ornamental fruits will appear. If pests severely damage a plant year after year, get rid of it and begin again with another plant. You're after a different kind of perfection when you garden for birds.

You'll know you've created a healthy environment when birds start nesting on your property. You can encourage them by providing birdhouses or nest shelves. Birdhouses serve as substitutes for the cavities that occur naturally in mature forests. Since the usual practice in the suburbs is to cut down dead trees or limbs where hollows form, cavity-nesters such as woodpeckers, chickadees, and bluebirds are now hard-pressed to find nest sites. Unless they present a potential danger to people and property, dead trees and limbs should be left standing. If the sight of a dead tree bothers you, plant a Virginia creeper or Boston ivy up the side for autumn color and fruit.

LARRY LEFEVER FROM GRANT HEILMAN

Big branches that fall from your dead trees can be used as the base for a brush pile, which will offer birds shelter at night and protection from harsh weather and predators. To build a brush pile, lay a foundation of thick branches a foot or two deep, then pile several feet of finer branches over them. Top it off with a layer of conifer branches and you'll have a safe, dry refuge for birds.

GREGORY K. SCOTT

This picturesque bird garden (far left) makes maximum use of edge, juxtaposing different types of habitat. Above, bluebirds splash in a backyard birdbath. Water is an amazingly effective songbird attractant, particularly in arid regions.

Finally, no bird habitat is complete without water. Few of us are blessed with a stream running through our property, but a multitude of substitutes exist. Large terra-cotta saucers and homemade concrete birdbaths can be set on or in the ground. The familiar pedestal birdbath is a pleasing garden feature. Whatever the receptacle, the water should be only an inch or two deep—birds don't like to go in much over their ankles. Birds are attracted to the sound and sight of dripping water. An easy way to get a good drip is to drive a nail through a bucket or plastic milk bottle, fill it with water, and hang it up over the birdbath. The slow drip, drip, drip of the water is a magnet for songbirds, especially in arid climates.

Like all gardens, landscapes designed to provide bird habitat take time to mature. Although many plants flower and produce some fruit when young, they usually improve with age. Start now. As the years pass, cities, shopping malls, and development projects will keep encroaching on the woods and fields where birds flourish. Perhaps in a decade or two, an exhausted warbler, a loser in the battle for territory in the diminishing realm of good habitat, will find a haven among the hawthorns you plant this year. □

This article was prepared with financial assistance from the New York State Natural Heritage Trust.

LIFE IN THE CONDO

Eugene S. Morton

For the gregarious purple martin, group living is a good long-term investment but the entry fee is high!

Purple martins are finicky when it comes to settling into newly erected colony houses. These multi-apartmented structures, perched on poles about 15 feet tall, might more aptly be termed martin condominiums. As is the case with condos inhabited by humans, location is important: martins prefer waterfront properties with lots of open space.

LEONARD LEE RUE III

Human landlords offer purple martins the best in modern housing—for example, this classic wooden condominium. A single adult male (right) may control most of the condo's apartments. Yearling males are forced to occupy the least desirable units.

Exterior architecture is less important than location, but there are regional and historical differences in the styles martins prefer. Before humans inhabited North America, purple martins nested in dead snags riddled with woodpecker holes and other natural crevices. But subsequent generations of martins were quick to take advantage of the homes provided by people. The Cherokee Indians hung up hollow gourds in their villages to attract martins. European colonists constructed miniature mansions for the birds—the largest of these is reported to have had over 600 rooms! Today martins in eastern North America depend on humans who provide them with housing in return for their songs, beauty, and insect-eating abilities. Many people erect prefabricated aluminum units, but in the South, martin landlords still offer the birds an array of gourds hung from arms on a tall pole.

Martins don't always move in right away when a new condo goes up. I was lucky. I placed a shiny new aluminum condo in my backyard on the Severn River near Annapolis, Maryland, in the fall of 1975, and two pairs of yearling martins settled there in the spring. Next year an odd thing happened that illustrates just how finicky martins can be about their housing. A mile up the river, the landlord of a long-established colony moved away. The new landlords decided to paint the martin house to match their own house, changing the color from white to green. The martins snubbed their old house and settled at my place! Soon my backyard began to resemble a planned development as I erected two more condos, each with 24 rooms, to meet the demand.

That mass move made me curious about the colonial habits of breeding purple martins. Why *are* they colonial? I had seen little evidence of cooperation among them: no mass mobbing of crows, no sharing of information about food locations, certainly no condo covenants agreed upon by the owners. Instead, the oldest males fought to control as many compartments in the condo as possible. One male martin controlled an entire 24-compartment condo for 4 years of his 10-year lifespan.

Martins often fight with one another, males against males, females against females. I've seen them fall to the ground, grappling, pecking, and clawing. Some bird species perform a behavior called "match-countersinging" to defend large territories against intrusion. Male martins use song in a similar manner, but yell at birds only a few compartments away. A martin will match-countersing with its neighbor, the two slinging the same insulting song back and forth. Females also have songs they use to rant at neighbors and newcomers. Their scratchy, growling song often precedes an attack.

In short, purple martins seem to want to nest as isolated pairs like their tropical relatives, the gray-breasted and brown-chested martins. And single, isolated nesting cavities are far more common in nature than collections of cavities. But although purple martins *act* as if they would rather live in single-family houses, they do not. Their tolerance of new neighbors increases only after their mates have built nests.

My simple enjoyment of backyard martins turned

MASLOWSKI PHOTO

gradually to research into the nature of their coloniality. As a biologist interested in animal communication and social behavior, I was intrigued by the enigma of the martin colonial breeding system. I decided to begin banding the young in my colony and in 13 other colonies in the Annapolis area. I was joined by another martin enthusiast, Robert Patterson, who devised a means to trap breeding adults in their compartments at night. I placed standard U. S. Fish and Wildlife Service bands on the birds, and also color bands so that I could recognize each individual.

Our first interesting discovery was that a young martin I banded in a colony about two miles from my backyard had returned not to its birthplace but to my colony for its first breeding season. This after wintering in Brazil (purple martins are migratory). Leaving home to breed, I soon discovered, was the common pattern for martin yearlings. Only a few of the birds that fledged from my colony returned the next year, yet yearling birds made up nearly half of the breeding birds in my backyard. Some of them I had banded as nestlings in nearby colonies, but most wore no bands. I had no idea where they came from or why they moved to my colony.

The first martins return from their wintering grounds in Brazil during April. All of these are fully adult males. In mid-May they begin to perform a behavior that I at first found bewildering. Each morning the adult males fly into the black predawn heavens and sing until sunlight colors the morning-gray landscape. They sing a special song not given during the day—a loud, continuous series of chirps and scratchy but still pleasing sounds, presented in a syncopated series of about seven to nine notes repeated over and over.

Dawnsinging is not a group chorus. Each male flies his own path in slow wide circles, singing his own unique song. I noticed that males sometimes changed their songs from one year to the next. What was the purpose of the bizarre song? The functions of songs generally accepted by researchers—defending a territory or attracting a mate—could not explain this one. Defense of a condo should be most effective from the front porch, not a mile away in the dark sky. And the singing males already had mates.

JAMES R. HILL III

A nest-building female (above right) may draw the rapt attention of an adult male. Not at all monogamous, he will attempt to mate with several females. Below right: by analyzing blood samples from nesting birds and their young, researchers showed that adult males father more offspring than do cuckolded yearlings. They also feed their young more ardently (above).

I found that the only thing correlated with dawnsong was a sudden increase in the number of yearling martins arriving at the colony. Did the dawnsinging attract them? Was it a sonic beacon advertising nesting sites for potential first-time homeowners? This explanation just didn't seem to fit. Why would pugnacious adult male martins that controlled many apartments and chased away competitors want to attract newcomers?

I finally discovered a clue in another behavior of the adult martins. After dawnsinging, these males did not sit by their apartments, idly waiting for the hatching of their eggs. Instead, they took up positions in my garden — a favorite place for martins to gather nest materials. Females and young males landed and inspected each twig or piece of straw before selecting one to carry back to the nest. I thought their efforts to furnish their homes made a hilarious spectacle, since the long pieces they carried horizontally did not fit easily through the small nest holes. But the adult males perching upon my tomato stakes were not looking for amusement or even for nesting materials. Any female that was not accompanied by her mate became the target of their rapt attention. The goal of each male was to copulate with unguarded nest-building females —birds that were in their most fertile period and just about to start egg-laying.

Adult males appeared to recognize a fertile female about to lay an egg by her labored flight. Female martins would often fluff and shake as they flew from their colony apartments, as though to show that their abnormal weight was due to a recent dip in the Severn River. Such subterfuge was unmasked, however, when they landed and searched for that perfect piece of straw.

These females were almost always the mates of yearling males, birds whose late arrival at the colony meant they lagged behind the older birds in nesting. Old males so harassed yearling females that their nests were often incomplete. The desperate birds sometimes laid their eggs on the bare floor of the apartment. A few females deserted the garden and resorted to breaking twigs off a standing dead pine where they could escape from the old males by flying up or down.

After watching this behavior, I began to wonder whether the purpose of dawnsinging was to attract yearling males so that the adult males could forcibly copulate with their mates. Many songbird species nest several times per season, but since martin young take 68 days to grow from egg to independence, the birds can make only one nesting attempt per year. Therefore, a male martin can increase his reproductive output only by fertilizing the eggs of more than one female.

Does this mean that martins nest in colonies so that the adult males can produce more offspring? To answer this question I needed a way to count the number of offspring fathered by the adult males. I employed a new technique called DNA fingerprinting—taking blood samples and studying the genetic makeup of the blood cells of parents and offspring— to determine whether or not a male martin was the actual parent of the young in its nest. DNA fingerprints look like a series of bands arranged in a column. Each individual inherits its bands from its parents, 50 percent from mom and 50 percent from dad. If a young bird is truly the genetic offspring of the parents that rear it, then each band in its fingerprint will also be found in one or both of the parents. If it has bands not found in either of the parents caring for it, then it has inherited them from another bird. Using the new technique we could tell whether yearling males had been successfully cuckolded by older males.

For a decade I have been hosting "martin night," an annual dinner party at which friends, students, and innocent bystanders are coerced into staying up till dawn, catching, banding, weighing, and measuring nesting purple martins to help with my research. In 1987 the party occurred on schedule in early July. At this time of year the eggs have hatched and the parents roost inside their apartments with their young. The afternoon before the party we set up Robert Patterson's traps — wooden frames, one for each condo, rigged with strings so that small wooden blocks would fall into place over the apartment doors when the strings were cut. Martins are wonderfully tame birds and do not seem to remember our tricks from one year to the next. They soon began using the strings, which led from the roof of each condo to stakes in the garden, as perches. At 10:45 P.M. the birds had settled in for the night, the strings were cut, the traps fell, and the martin party began.

This time molecular geneticist Michael Braun of the Smithsonian Institution joined the team. He deftly took a small blood sample from each adult bird and from their nestlings. We took samples from seven families headed by adult males and seven with yearling males—half the total number of breeding pairs in the colony, and so an appropriately large sample. The "bloodletting" did not seem to harm the birds. The next morning at daybreak, when I opened the apartment doors to let them free, the adults fed their young normally.

Martin parties are fun, but what did we learn? The adult males had fathered 96 percent of the young in their nests. In contrast, the yearling males had fathered only 29 percent of their young— most of the nestlings they tended were actually the offspring of some other male. That's quite an entry fee for yearling males to pay for their first apartment! It's more like a nonrefundable deposit. But it's better than not breeding at all.

This cuckoldry has an effect on the behavior of yearling males. They do not feed their young as ardently as adult males feed theirs. Their mates take up the slack.

You might think that yearling males could avoid the high entry fee at established colonies by moving to newly erected condos, where there are no older males around to harass their mates. But here they have a problem. A single yearling male cannot get a mate unless two or more other yearlings take up residence at the new place. Females seem to like the gregarious life and will not nest in isolation from other martin pairs. Thus it is not easy for yearling males to strike out on their own.

I concluded that despite his unneighborly behavior, an adult male martin gains by nesting colonially. The older males have the opportunity to fertilize many females in addition to their mates. The results of my DNA fingerprinting study showed that on average old males sired 3.6 young through extra-pair copulations, in addition to the 4.5 young produced by their mates. A martin nesting alone would not have the opportunity to father so many young. In addition to this enormous gain in fertility, the older males' offspring are more likely to fledge than are those of the yearlings.

LEONARD LEE RUE III

The oldest birds take the highest apartments, leaving the lower compartments (those most vulnerable to climbing raccoons and snakes) for the yearlings.

An adult male martin must risk a dangerously early return from Brazil to North America in order to procure and defend empty apartments in which he will not nest. Into these apartments he attracts yearling males. The risks prove to be worthwhile, though, because the yearlings court and pairbond with females, providing the older males with the opportunity for extra fertilizations. The colonial males leave behind more offspring than do those that shun condo life. Slowly but surely, the genes underlying the behaviors associated with a colonial lifestyle have become more and more common in the population of purple martins as a whole. Thus martin condos erected by martin-loving people are what the forces of natural selection have caused martins to prefer.

What of the yearling males? The lifestyle that has evolved for purple martins doesn't seem to favor young males setting out on their own. But yearling martins become older with time, and the debts they incur, the high entry fees they must pay, are returned with interest when they too begin to sing in the dark May sky. □

Eugene Morton is a research zoologist at the Smithsonian Institution's National Zoo in Washington, D.C. He studies animal communication, social behavior in birds, and tropical migrant birds. Gene and his wife Letty live with 90 purple martins near Annapolis, Maryland.

EUGENE MORTON

Further Reading

Layton, R. B. *The Purple Martin.* (Jackson, Mississippi: Nature Books Publishers, 1969.)

Morton, Eugene, Lisa Forman, and Michael Braun. "Extrapair fertilizations and the evolution of colonial breeding in purple martins." *The Auk*, vol. 107, pp. 275–283; 1990.

For more information about the purple martin, or to purchase a 60-minute cassette of martin dawn song, write to the Purple Martin Conservation Association, Edinboro University of Pennsylvania, Edinboro, Pennsylvania 16444.

TOTEM BIRDS

Photographs by Tom and Pat Leeson

Carved columns tell tales of the raven

A century ago, monumental birds flew above the villages of the Tsimshian, the Tlingit, the Haida, and the Kwakiutl. Hovering at river's edge and ocean shore in the cool coastal rainforests of the Pacific Northwest and southern Alaska, these birds spread their wings atop strongly carved cedar logs that we call totem poles. The Native American artists who sculpted the poles covered them not only with birds but also with sea otters, killer whales, grizzly bears, salmon, frogs — the inhabitants of the natural world around them — as well as fantastic mythical creatures.

Carved with skill, elaborately painted, totem poles were not merely decorative, nor were they objects of worship. They served to illustrate myths and legends, to signal the owner's ancestry and clan, or to honor the living or the dead. Poles were erected in front of the village houses, strung out in a line fronting a river or the ocean, signalling to those approaching from the water the occupants' wealth, rank, and family history.

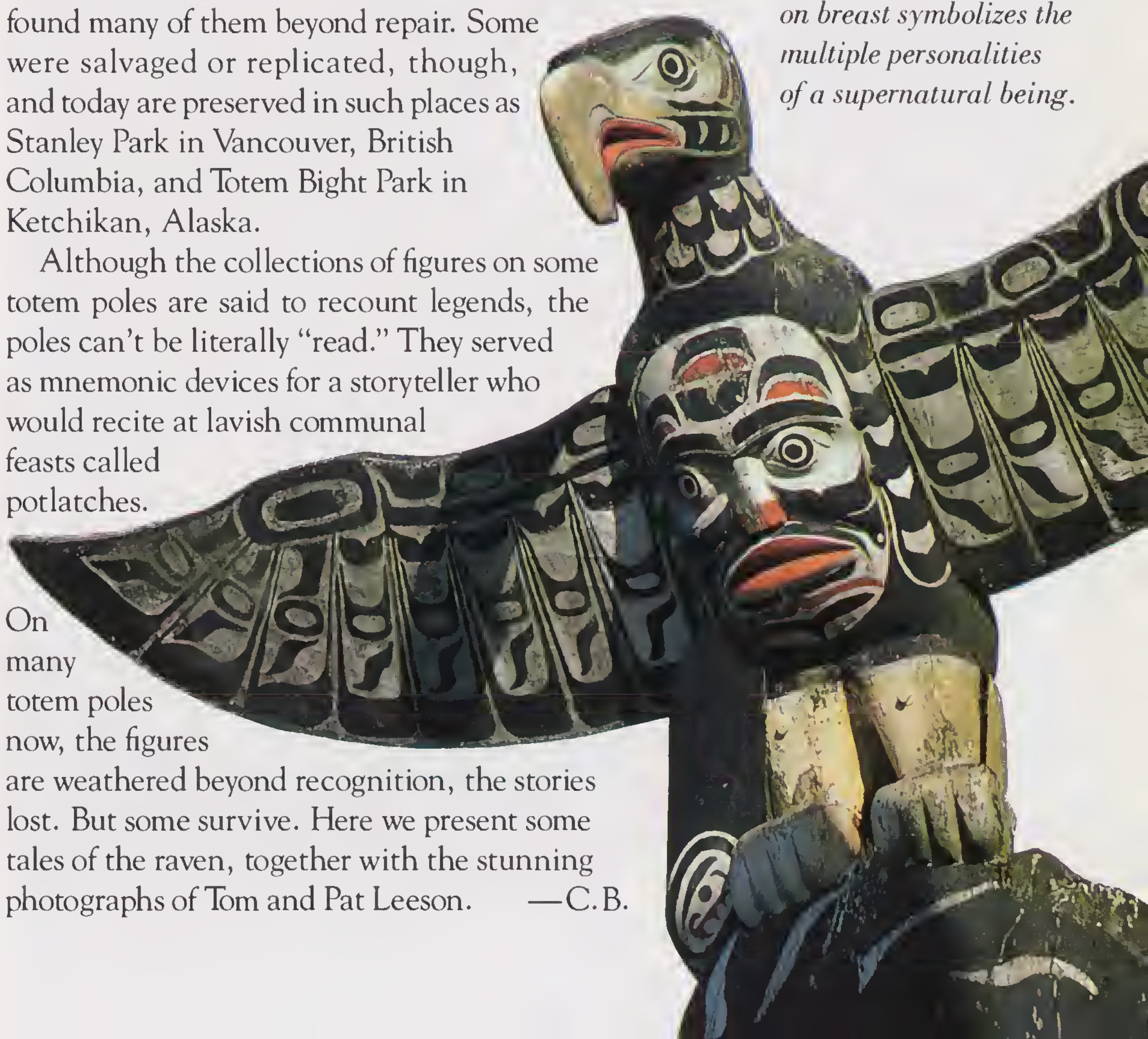
Two birds — raven and eagle — are the symbols of the two major clans of the Northwest peoples. Raven, called "the trickster," was a popular figure in Native American legends, a magical being who sometimes played elaborate practical jokes but who was also humankind's principle benefactor, bringing fire, light, and other necessities to the people. The eagle, a symbol of power for many cultures, can be recognized in totem carvings by the short, strongly curved beak. The mythical thunderbird, with outspread wings and mysterious horns, is often seen on the poles of the Haida people. This fearsome supernatural bird was believed to feed on killer whales and to throw snake-shaped lightning bolts. A few other birds, including the cormorant, hawk, and loon, were occasionally carved on totem poles, but the raven, eagle, and thunderbird are by far the most common.

Compared with other artifacts of Pacific Northwest cultures, such as ceremonial masks, totem poles have a rather short and recent history. The free-standing poles evolved from the carved interior posts that supported traditional wooden communal lodges. The detached poles were erected outside, in front of the lodges, although sometimes a large pole served as a door, with an arched entranceway carved right through. Historical records show the first totem poles appeared in the late 1700s, when European traders visiting the region in search of sea otter pelts traded metal knives for the sleek furs. With sharp-edged, durable tools readily available, poles could be more rapidly and elaborately carved.

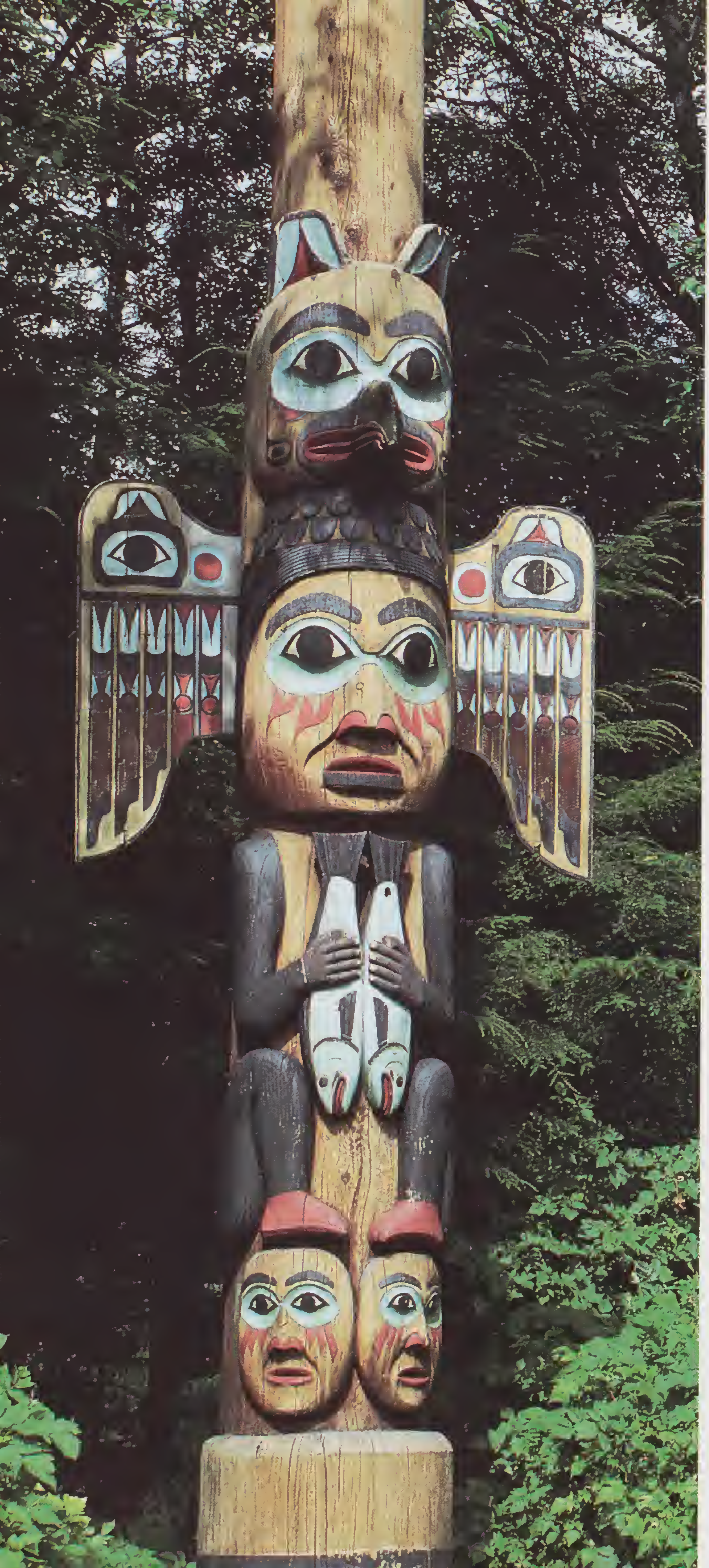
Totem poles had their heyday in the 1860s and 1870s, before smallpox decimated many villages and zealous missionaries converted the people who had followed the old ways. Since then, most totem poles have rotted away. Cedar logs decay quickly in the moist air and sandy soils of the Pacific Northwest: a Civilian Conservation Corps effort in the 1930s to retrieve and restore totem poles from abandoned villages found many of them beyond repair. Some were salvaged or replicated, though, and today are preserved in such places as Stanley Park in Vancouver, British Columbia, and Totem Bight Park in Ketchikan, Alaska.

Although the collections of figures on some totem poles are said to recount legends, the poles can't be literally "read." They served as mnemonic devices for a storyteller who would recite at lavish communal feasts called potlatches.

On many totem poles now, the figures are weathered beyond recognition, the stories lost. But some survive. Here we present some tales of the raven, together with the stunning photographs of Tom and Pat Leeson. —C.B.



Two different carvings of the supernatural thunderbird. Human face on breast symbolizes the multiple personalities of a supernatural being.



Raven and the Gift of Salmon

At this time in the life of the world there were no salmon in the waters for the people and animals to eat. Nothing but miserable shellfish and sculpin and cod.

One day Raven and his two slaves were fishing and became lost in a thick fog. Suddenly a beautiful woman appeared in the bow of their canoe. She asked for Raven's hat of spruce roots, and held it upside down. The fog swirled into the hat and was gone.

Raven decided to take Fog Woman as his wife, and he took her back to his lodge. One day, while Raven was away on another fishing trip, Fog Woman sent a slave to fetch water in the magical hat. When he pulled the brimming hat from the river, a bright fish was swimming inside—the first salmon.

Fog Woman and her slave hastened to cook and eat the salmon before Raven returned. But the clever Raven noticed the shreds of red meat in the slave's teeth and asked Fog Woman to bring more of the wonderful fish.

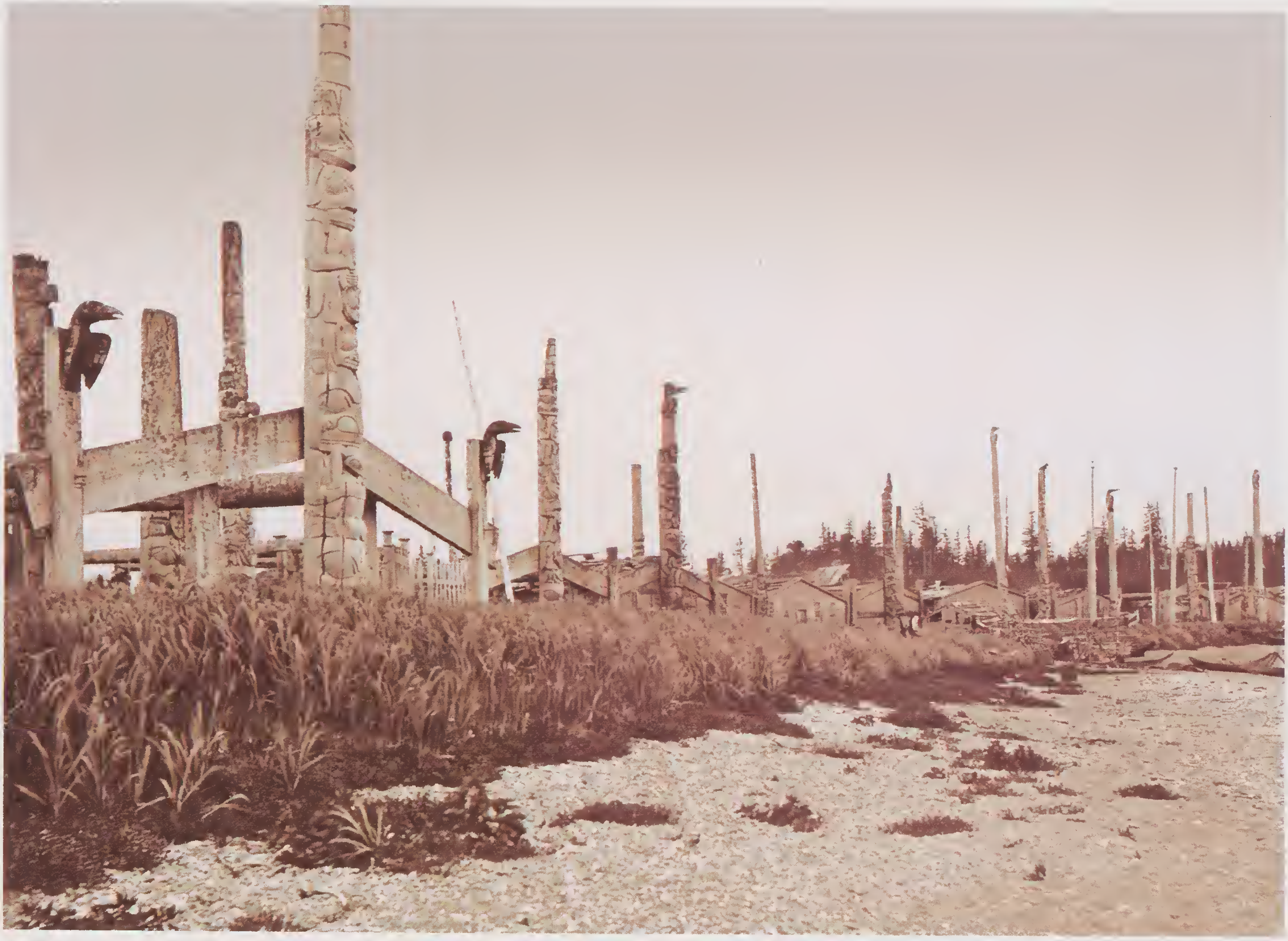
So Fog Woman told her husband to prepare a smokehouse, and in four days' time the stream by their camp was running with salmon. Together they caught, dried, smoked, and stored the delicious salmon.

Now Raven was feeling prosperous and comfortable, and he forgot that Fog Woman had brought the salmon to him. He began to be unkind to her. He ignored her and abused her. One day in a fit of rage he beat her with a salmon's backbone, so that the spines pierced her side.

Fog Woman was humiliated, and she fled. When Raven chased after her she slipped through his fingers like mist. The dried salmon in the smokehouse came alive and followed her, away down the river, leaving only their narrow tracks on the sandy beach.

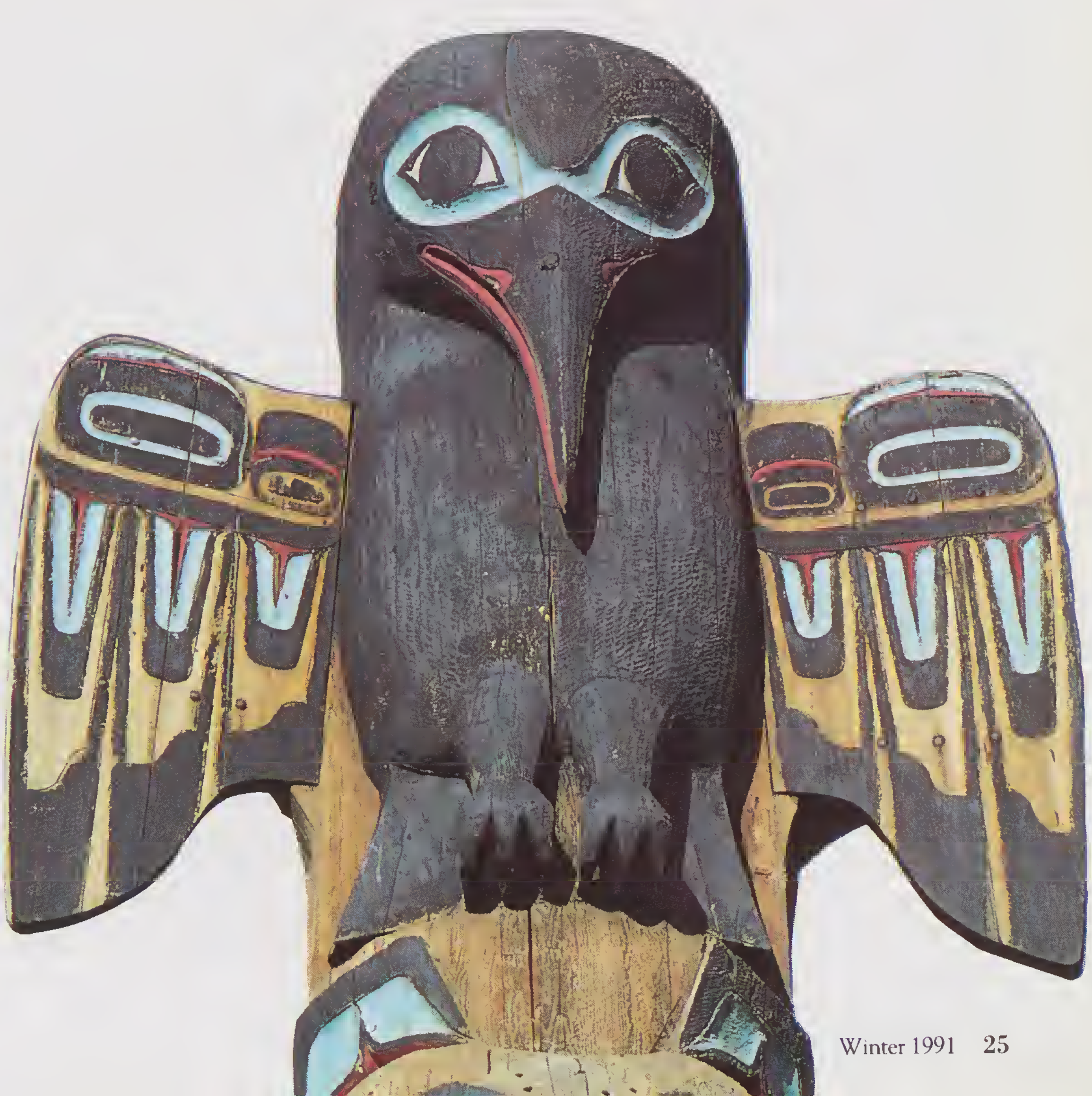
So Raven lost his wife and his wealth. But salmon had been created and can be found in Alaska to this day.

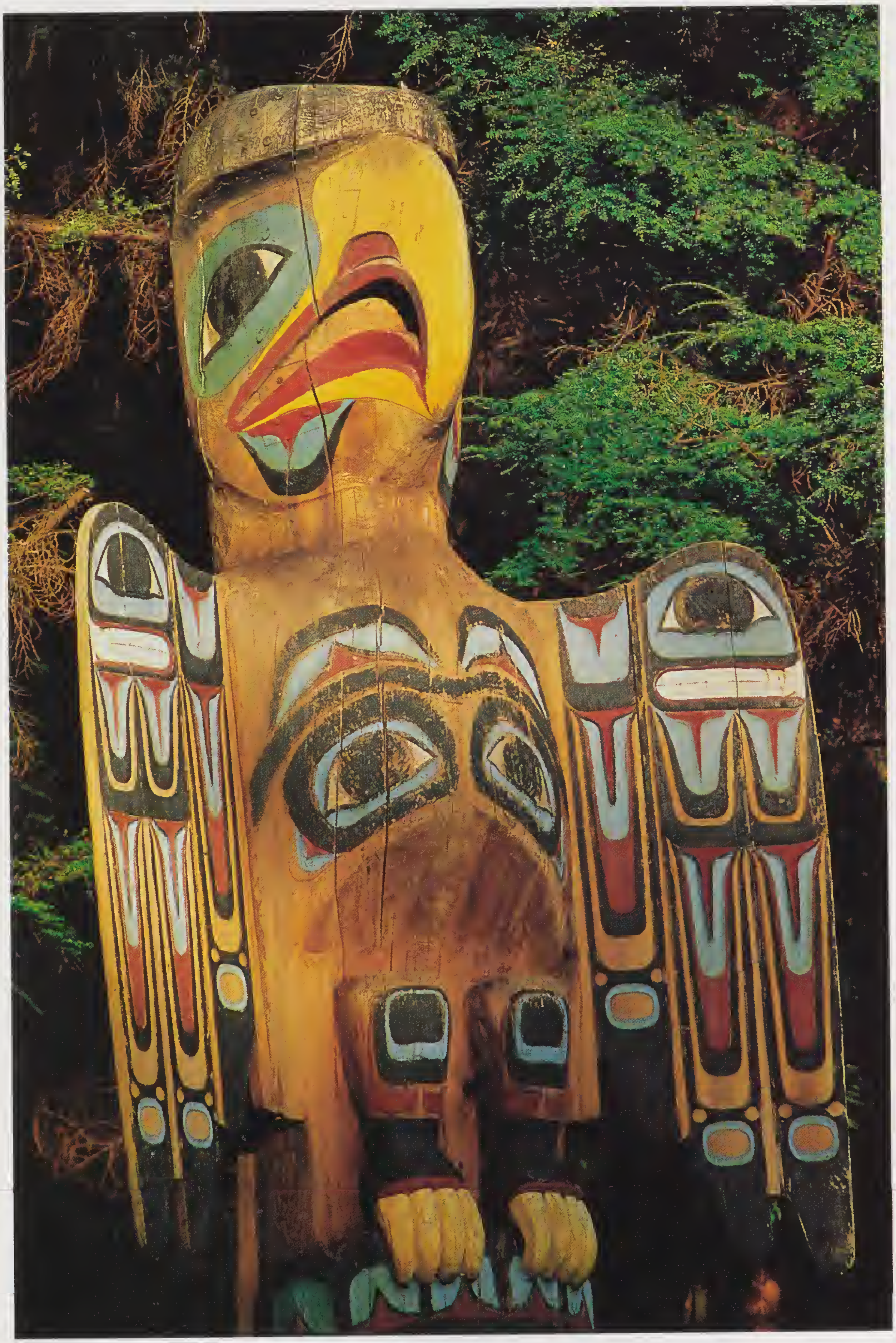
Raven is the uppermost figure on this totem pole. Below him, Fog Woman holds a salmon. The faces below her are the two slaves.

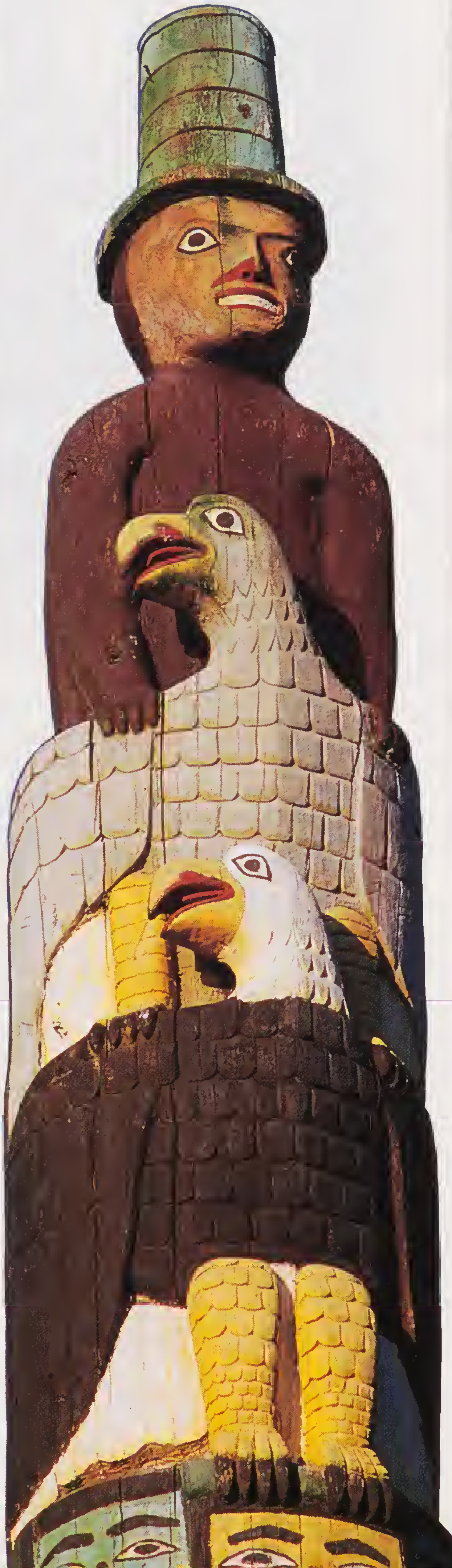


Neg. No. 42296, Photo Dossetter. Courtesy Department Library Services, American Museum of Natural History

In one tale the cormorant, below, witnesses the wily Raven deceiving a trusting bear. Raven then cuts out the seabird's tongue so he cannot tell of the crime and sentences him to a life of exile on wave-washed rocks — where cormorants can be seen to this day. Above, totem birds fly over an abandoned village.







Above, Thunderer's Pole at Totem Bight Park is a memorial pole, erected to honor one of the Thunder House people. Right, a village watchman stands guard at the top of a Haida pole. Below are two eagles, a clan crest. The painted faces represent mountains and clouds, the habitats of eagles.

Raven and the Light of the World

In the early days, before the sun and moon shone above the world, the people and the animals walked in darkness. So Raven set out on a journey to find daylight. He headed for the Nass River where lived a great chief who owned the sun, moon, and stars. All along the way Raven met animals and humans who longed for daylight and wished him well. But as he approached the Nass River he met people who mocked him.

Raven drew near the great chief's camp and planned how he would get inside. Now the chief had a beautiful daughter who was closely guarded. But Raven turned himself into a pale hemlock needle and hid at the bottom of her drinking bowl. She swallowed the needle with the water and took Raven inside her.

Soon it was clear that the chief's daughter was with child. This caused great confusion in the tribe. Even the most powerful shaman could not undo Raven's trick.

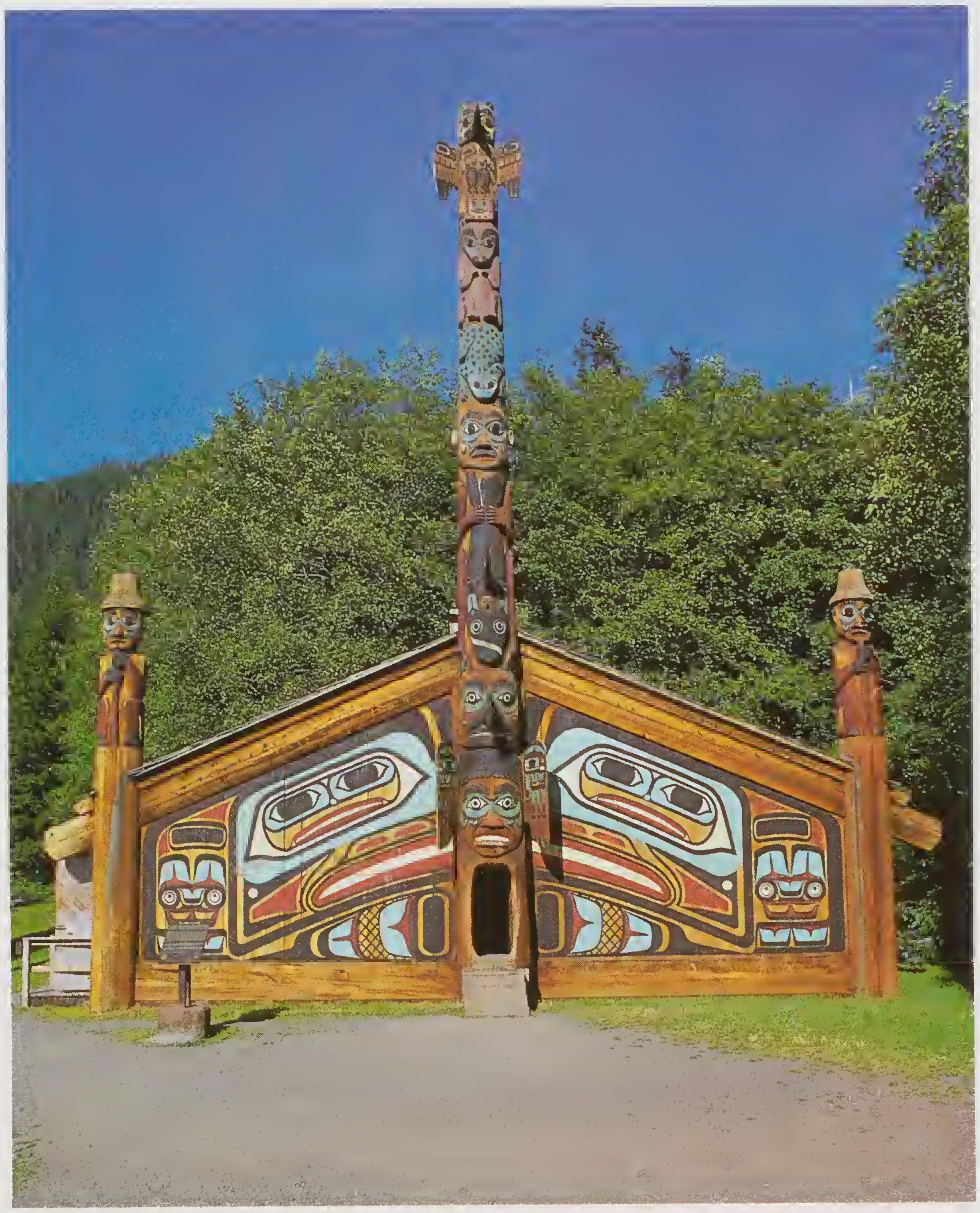
Before long Raven was born as a human child. The great chief became very fond of the baby and gave him everything he wanted. The boy grew very fast. One day he saw the moon hanging on the wall of the lodge, a lovely pale disk, and he begged for it. The chief did not want to give him the priceless treasure but Raven cried and cried for it until his grandfather feared he would be sick. He set the moon on the floor next to the child, who played with it happily.

After a while, Raven carelessly tossed the moon in the air. It sailed out through the smokehole and into the sky. Then Raven pretended to cry for the loss of the toy. He begged his grandfather for the box of daylight, which was kept on a high shelf.

He cried for days without stopping. Finally, his grandfather relented and gave him the box of daylight, the greatest treasure of the world.

Now the slaves had grown suspicious and watched Raven closely. One day when a large fire burned in the lodge he took the box and rode up toward the smokehole on the draft of the fire. The chief saw him escaping and used his powerful will to hold Raven back. But Raven called all his strength into his wings and broke free and flew away.

As he traveled back the way he had come, the people of the Nass River once again mocked him. Raven warned them, "Give me food or you will be turned into the animal whose skin you wear." When they refused, he opened the daylight box. There was a great flash. The people were turned to animals—some into rabbits; some, wolves; others, otters. But daylight had at last come into the world.



The figures on the pole that forms the entrance to a reconstructed community house at Totem Bight Park (above) recall how Raven brought light to the world. The legendary Raven is the top figure. At his feet is the box of daylight.

WILL-O'-THE-WISP

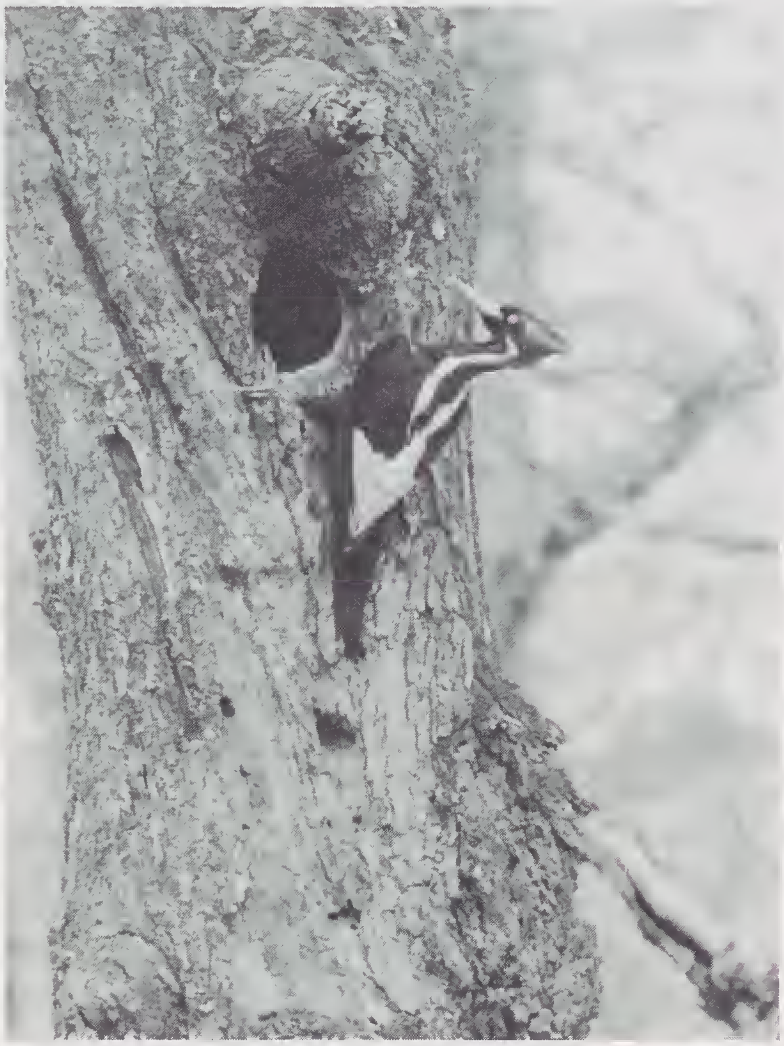
Text and photographs by Jerome A. Jackson

Though the entire episode lasted only three seconds, the bird's image is clear in my mind. Large, black and white in color, it zipped past within 30 feet of where I sat with my telephoto lens pointed uselessly at a distant tree. Its wings were folded back against its body in the characteristic downward glide of a woodpecker as it moved downslope through a dense Cuban forest. Then it was gone, leaving me in stunned silence. Since there are no other large, black-and-white birds in the mountains of Oriente Province — no pileated woodpeckers to confuse the issue — all the evidence pointed to one species. For me the bird was an ivory-billed woodpecker. For science it was just one more will-o'-the-wisp.

That sighting occurred in March of 1988. I was working for the National Geographic Society at the time, trying to document the presence of the ivory-billed woodpecker in Cuba. The year before I had visited the same area for one day with Lester Short of the American Museum of Natural History, as well as other representatives from the International Council for Bird Preservation (ICBP), and several Cuban scientists. Our mission then was to evaluate the status of bird conservation in Cuba for the ICBP.

The Cuban government had just set aside a large tract of mountain forest as a refuge because of an amazing find in 1986. A small number of ivory- billed woodpeckers — long considered extinct by ornithologists — had been rediscovered in the area by Cuban scientists, Lester Short, and other observers. Fortunately, the Cuban government recognized the importance of saving this critically endangered species, and went so far as to reroute a major north-south highway project to avoid the ivory-bill area.

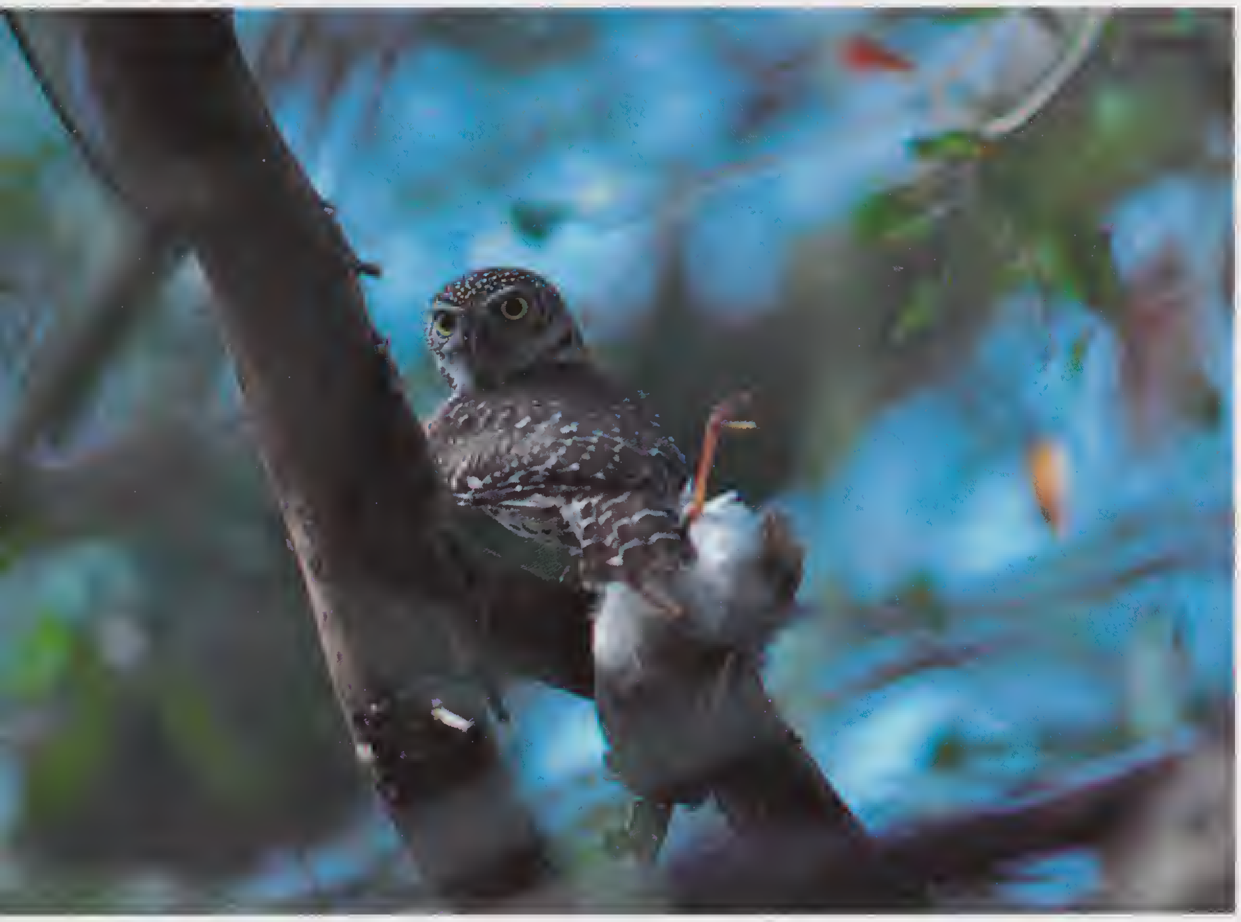
The ivory-bill's status in Cuba has been precarious for many years. In fact most of the specimens and records of the species in Cuba are from the 1800s. American ornithologists John Dennis and Davis Crompton did find and photograph a nesting pair in 1948 in a cutover montane pine forest similar to the area where the birds were recently rediscovered, but Dennis believed the ivory-bills were already on the brink of ex-



ARTHUR A. ALLEN

Scientists track the elusive ivory-billed woodpecker in the forests of Cuba

Long thought to be extinct, the ivory-billed woodpecker is alive but not well in this dense Cuban forest (left). The picture above, taken by Lab founder Arthur A. Allen in the 1930s, is still one of the best photographs available of this rare phantom.



Don't be fooled by the diminutive stature of the Cuban pygmy-owl; it's a highly effective predator. Author Jerry Jackson spotted this bird (above) with a fresh-caught Swainson's thrush nearly its own size. The Cuban macaw (on postage stamp, below) became extinct at the turn of the century. The colorful Cuban trogon (below right), is the national bird and a large and common island resident.

tinction. Their rediscovery 40 years later defies all odds. And still, although the woodpeckers have been seen in the mountains of Oriente Province by at least 10 competent observers since 1986, to date no photographs or sound recordings document this extremely rare bird's continuing existence.

Although a close neighbor, Cuba has been off limits for most U.S. citizens since the Castro revolution. Glasnost has not yet touched the icy relationship between the two countries. American citizens who visit Cuba as tourists may face a $50,000 fine and three years in prison! Scientists and journalists who travel to Cuba in the course of their work are exempt from these restrictions, however, so the doors were opened for me. My nearly 10 weeks in Cuba on three separate trips have allowed me to visit many significant parks and wildlife reserves, and to observe most of Cuba's endemic birds.

Nearly 800 miles long and 120 miles across at its widest point, Cuba is the largest of the Caribbean stepping stones leading from Florida to northeastern South America. Because of its size and position (90 miles south of Florida) it is an important stopover and wintering area for North American migrants. Loss of habitat or persecution of birds in Cuba could mean fewer migrants returning to the United States in spring, so it is not just the magic of ivory-billed woodpeckers that piques our interest in Cuba and its habitats.

Before Cuba was discovered by Europeans, the island was mostly forested. As with eastern North America, however, European settlement brought massive destruction of forest habitats. Today, less than 20 percent of Cuba remains wooded; bird populations that depend on forests are often seriously fragmented and isolated. On my trips I saw mile after mile of sugarcane fields and orange groves where native woodlands once thrived. The government is allowing forests to grow back naturally in some areas, including the ivory-billed woodpecker refuge. But in other areas natural forests are being replaced with pine plantations. Unfortunately, these include only young trees of single, commercially important species, and are completely lacking in the old growth and species diversity so necessary to sustain wildlife populations.

In some places I visited, particularly in the great Zapata Swamp, habitats are being altered by people cutting firewood and thatch, and by free-roaming, grazing livestock that change the natural plant communities. Nonetheless, birds are still abundant in Cuba. I found many of the endemic birds, as well as North American migrants, in hotel gardens, resorts, and city parks.

I also found that a love of nature is pervasive in Cuba, actively promoted by the government in schools, newspapers, magazines, and on billboards. I saw one billboard in downtown Havana featuring a chick emerging from an egg that urged: "*Cuida la Vida*" — "Care for Life." A poster in Baracoa on the northeast coast proclaimed: "*Cuidar la flora y la fauna es un deber de todos*" — "Care of the flora and fauna is everyone's responsibility."

Conservation is an important part of school curricula at all levels. *Zunzun*, a children's magazine published by the government for use in schools, takes its name from the local name for the Cuban emerald — the larger and more common of Cuba's two resident hummingbirds. The magazine regularly features articles about native plants and animals, their unique habits and habitats, and the importance of protecting them.

The Cuban emerald is also featured on the 10-cen-

3
ARA DE CUBA
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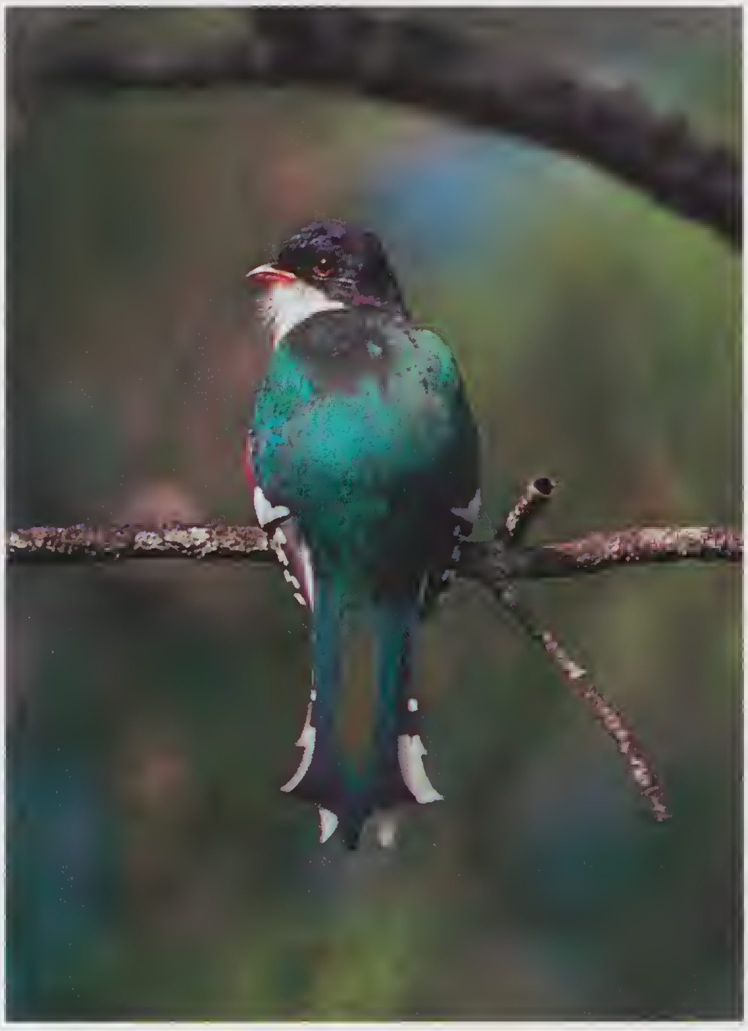
ARTHUR MORRIS/BIRDS AS ART



tavo coin specially minted for tourists. And one of Cuba's ornithological claims to fame is its other resident hummingbird — the Cuban bee hummingbird, touted as the world's smallest bird. Many endemic birds, including the hummingbirds and the colorful Cuban tody, are used on Cuban postage stamps.

The Cuban press has carried several news stories on the ivory-billed woodpecker — *El Carpintero Real* — specifically to inform Cubans of the bird's importance and to seek information about other possible populations. Shortly before the ICBP visit in 1987 some Cuban farmers found what they thought was an ivory-bill. They marched proudly into town with their captive in a box and turned it over to the authorities. Flanked by soldiers and a crowd of townspeople they slowly opened the box to reveal . . . a belted kingfisher!

The news of ivory-bills in Cuba is also stimulating a great deal of interest among birders from other countries. Bird watching groups from Canada and Europe now count significantly in Cuba's growing tourist industry. These groups travel about the country in comfortable minibuses, often guided by Cuban ornithologist and indefatigable birder Orlando Garrido.

To these visiting birders it seems as though Garrido knows the precise branch on which each bird will be found. They aren't far wrong. Orlando Garrido is intimately familiar with his native birds. His enthusiasm is an inspiration to his countrymen and his visitors. However, it is to Cuba's credit that the ivory-billed woodpecker area is off limits to birding groups. Too little is known and too few of the birds remain to take any chances on disturbing them.

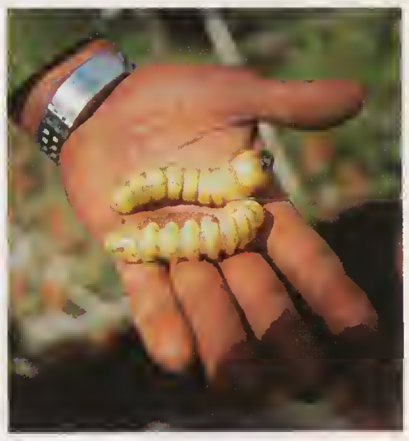
Among the interesting birds readily seen in almost any Cuban forest is the national bird of Cuba, the Cuban trogon. A large and common cavity-nester, this species clearly benefited from the abandoned nest and roost cavities of ivory-bills. The trogon's Cuban name, *tocororo*, is onomatopoeic of the bird's loud call.

Other cavity-nesting birds that might use and possibly compete for ivory-billed woodpecker cavities are Cuban pygmy-owls, bare-legged owls, and Cuban kestrels. A Cuban pygmy-owl is just a handful of fluff, but a terror for wintering warblers and other small birds. I photographed one carrying a Swainson's thrush nearly its own size! This tiny owl is active by day and I heard it in nearly every Cuban forest I visited.

The Cuban kestrel is considered a race of our American kestrel, but it has two distinct color phases — one with a breast slightly lighter than a North American bird, and the other with a much darker, rusty breast. We saw both color phases often in the ivory-billed woodpecker area. Nesting pairs included all possible combinations of light- and dark-phase birds. One pair nested in what was most likely an old ivory-bill cavity in a long-dead pine. I also saw wintering American kestrels, but always along roadsides and other disturbed habitats in the lowlands — never with Cuban kestrels.

As a woodpecker specialist I was particularly interested in seeing Fernandina's flicker, another native Cuban species. This bird does not occur in the montane habitat of the ivory-bill, but Orlando Garrido took the ICBP group to a "colony" of them in scrub forest north of Playa Giron. I say colony in a very loose sense, because little is known of the nesting habits of these birds. However, Les Short and I found seven active nests in an area of about five to seven acres — a nice cluster if not a colony. North American birders would quickly identify this bird as a flicker from its mannerisms, body shape, and call. But unlike the northern flicker, the Fernandina's has a heavily striped brownish plumage and a preference for nesting in the palms used for thatch cutting.

Cuban biologist Giraldo Alayon (above) measures the tunnels bored in a dead pine stump by beetle larvae. These oversized beetle larvae (below) are a prime food source for ivory-billed woodpeckers.



At least one of Cuba's cavity-nesting birds has become extinct since the arrival of European settlers. The Cuban macaw, a small, red parrot that might well have nested in ivory-billed woodpecker cavities, disappeared at the turn of the century — a victim of an active pet trade and the destruction of the bird's mature forest habitat. Only a handful of specimens tell us of its beauty.

It is fortunate indeed that the ivory-billed woodpecker has not shared the Cuban macaw's fate. It is very close, though. Once widespread in Cuba, these behemoths of the woodpecker clan disappeared there and in the United States as the virgin forests were cleared. The Cuban revolution in 1958 brought an end to the study of these birds by North American ornithologists on the island. At the same time, however, the pace of logging in the remaining Cuban forests greatly slowed when American lumber companies left, which probably helped the bird to hang on.

The cutover pine forests south of Moa and north of Guantanamo, where ivory-bills have now been seen, provide poor habitat. Also, the ruggedness of the terrain and the wariness of the birds make it impossible to even hazard a guess as to how many might survive. A pair? Perhaps. As many as 10 pairs? It doesn't seem likely. All observations have been fleeting glimpses.

At least some of the six national parks established in 1963 are in areas where ivory-bills once existed and they provide areas where forests are allowed to regrow without threat of harvest. One such park is La Guira in the mountains of Pinar del Rio, a few hours' drive west of Havana. Though ivory-bills once lived in these pine forests, no trace of them has been seen for decades. The forest near the park was cleared of merchantable trees long ago, but with government protection the natural habitats are recovering and La Guira is becoming a mecca for birds.

Cuban scientists continue to study the ivory-bill, though more areas need to be searched and more time spent. With protection the forest is maturing. Habitat quality has the potential to improve. But serious consideration should be given to the role of natural factors such as fire in the ecosystem. The Cuban pine is a fire-adapted species, yet wildfires have not been allowed to burn in these forests. I believe fire is needed to control understory development and allow the pines to reproduce. Would a more open forest benefit the ivory-bills? It would certainly allow more freedom of movement for such a large bird and would make additional foraging sites accessible. Would fire in its ecosystem help ensure a more stable supply of the large beetle larvae that ivory-bills are known to eat? A normal regime of fire every few years would provide a steady supply of dead trees for beetles to invade. And finally, are the birds truly of the pine forest, or are they just visitors from the mist-enshrouded lowlands? Only careful study can provide the answer.

For the moment, because of its wariness and the difficulty of human movement in the dense understory, the ivory-billed woodpecker is not a bird to chase. Persistence may pay off for the patient observer sitting silently in good habitat waiting . . . and hoping that Cuban efforts and time smile favorably on this rarest of birds. □

I have been searching the swamps of the southeastern United States for ivory-bills for the past several years under the auspices of the U. S. Fish and Wildlife Service. Thus far I have found no solid evidence of their continued existence in this country. If we cannot produce documentation by 1992, USFWS plans to initiate actions to declare the North American subspecies extinct.

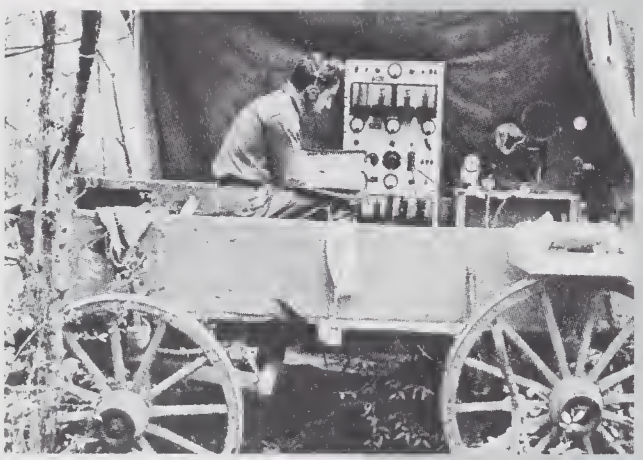
I appeal to readers to write to me with any records or possible sightings of ivory-bills, or with information about specimens or old field notes that might have been overlooked because of their presence in small libraries or museums. Write to: Jerome A. Jackson, Department of Biological Sciences, P.O. Drawer GY, Mississippi State, MS 39762-5759.

Jerome Jackson is professor of biological sciences at Mississippi State University and is recognized as an expert on woodpeckers, especially the endangered red-cockaded and ivory-billed woodpeckers. The author of numerous scientific and popular publications, Dr. Jackson is currently writing a book about the ivory-billed woodpecker for Smithsonian Institution Press.

THE SEARCH GOES ON

The ivory-billed woodpecker is extinct, ornithologists concluded more than 40 years ago. The bird, nevertheless, still haunts scientists and bird watchers, its reedy, nasal voice taunting them into slogging with camera and microphone through parts of the species' old stomping grounds: the once-virgin, now cutover pine forests of America's southeast and the mountains of northern Oriente Province in eastern Cuba. This year a Cuban expedition searches the headwaters of the Rio Jaguani River, about 500 miles from Havana.

The goal of each of these expeditions has been simple but excruciatingly elusive: not only to hear one bird's *yamps* and *paits* or the seesaw of two birds: *nack . . . nack-nack . . . nack . . . nack-nack . . . nicketynicketynicketynicketynick*; not merely to glimpse the majestic crest, the 20-inch, 20-ounce, black-and-white body, or the very long, strong, off-white bill; but to photograph, to record, to confirm beyond any doubt the existence of the ivory-billed woodpecker.



ARTHUR A. ALLEN

Fifty years ago Arthur A. Allen and Peter Paul Kellogg made their unique ivory-bill recordings from a mule-drawn wagon packed with heavy sound equipment. Cuban scientists use these recordings today as they search for the elusive giant woodpecker.

The success of the current expedition may rest upon the past efforts of a team from Cornell University. In 1935, Arthur A. Allen and Peter Paul Kellogg (who together later founded the Lab of Ornithology) packed up the first-ever bird sound recording truck, an ingenious homemade contraption, and headed for a known ivory-bill hangout, an 82,000-acre tract of virgin forest along the Tensas River in Louisiana owned by the Singer Sewing Machine Company.

The visit was a monumental success. In no time the team had spied a nesting pair of birds, and the rush to document was on: photographs were taken, drawings were rendered, nesting behavior was studied, and the distinctive calls captured on a precious tape that now, over 50 years later, is still the only recording available.

In the late summer of 1990 Cuban scientists began the first of three seasons in search of the ivory-bill. The Lab is assisting the effort by supplying copies of Dr. Allen's ivory-billed woodpecker recordings. The scientists hope that the sounds on the Cornell tapes will serve as an audible analog of a duck decoy, that the curiosity of a live individual will be aroused to the point where he may call back, or pop out of hiding to see who is calling. The sounds from the past could make the difference between a failed project and a stunning rediscovery. —J. C.

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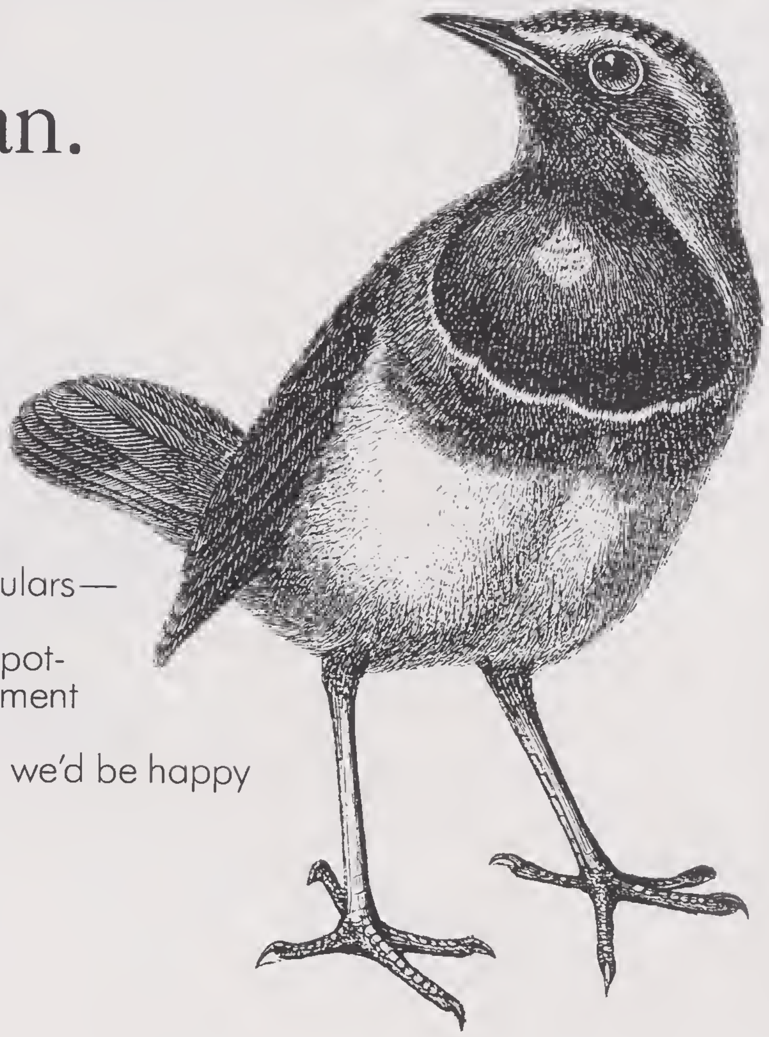

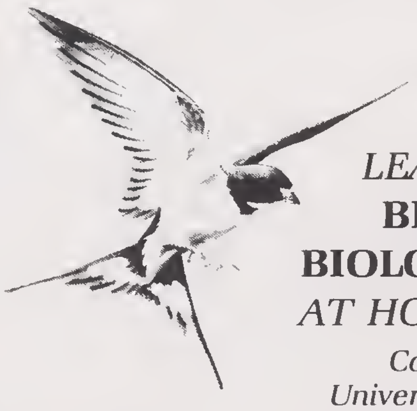

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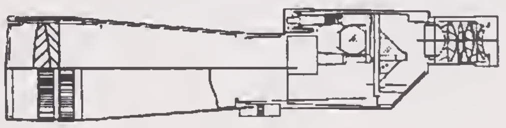

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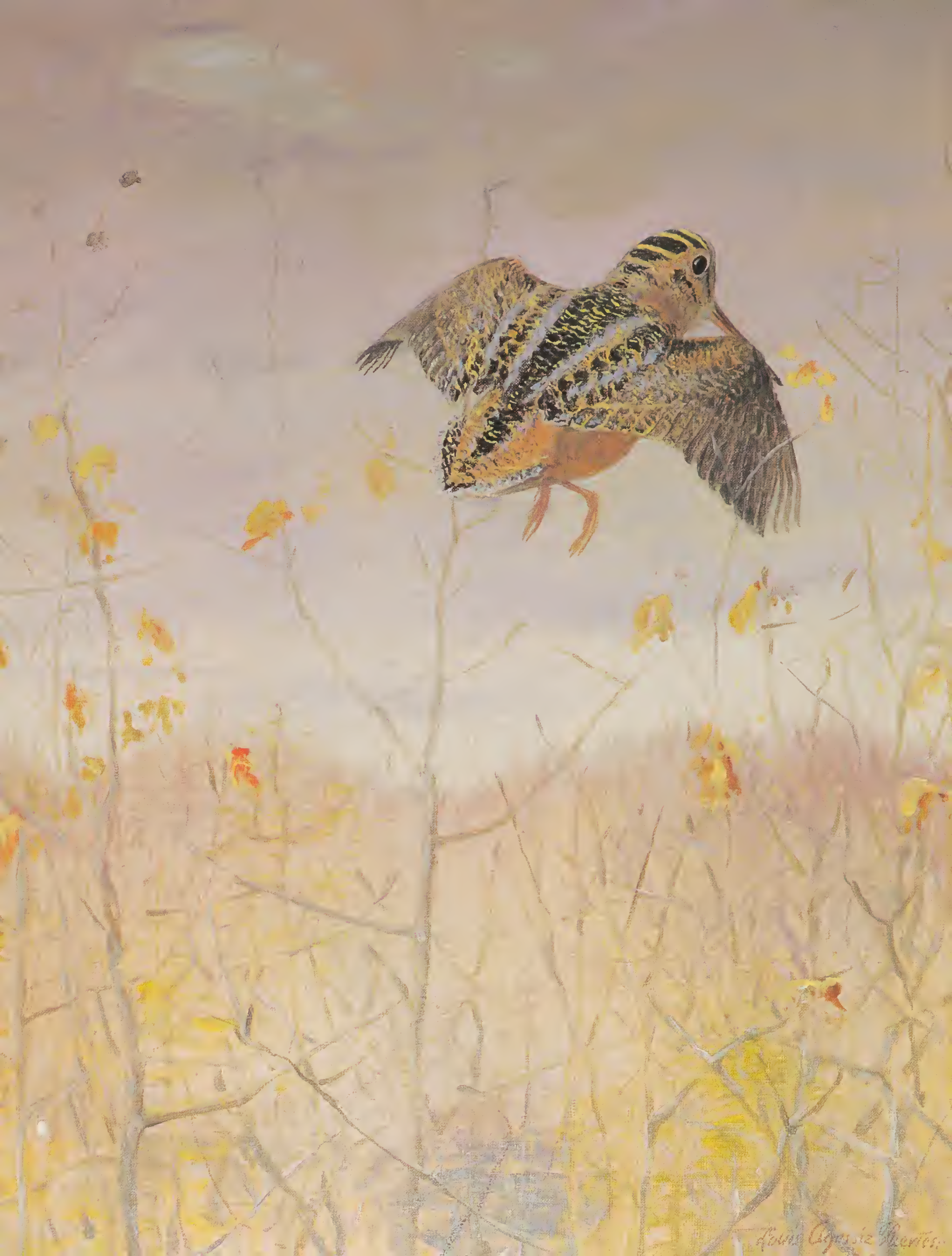

Louis Agassiz Fuertes.

SKY DANCE

Aldo Leopold

I must be sure that, come April, there be no dearth of dancers in the sunset sky.

Aldo Leopold was a man ahead of his time. Though more than 40 years have passed since he wrote his remarkable essays, his writings to this day stand as a potent voice for environmental protection and conservation. Leopold preached a new ethic that recognized the inestimable value of wilderness and wild creatures to the world. Writing shortly before his death in 1948, he said, "For us of the minority, the opportunity to see geese is more important than television, and the chance to find a pasqueflower is a right as inalienable as free speech."

Born in 1887, Leopold had a multifaceted career, first working in the U. S. Forest Service, then as associate director of the Forest Products Laboratory in Madison, Wisconsin, and finally as the chair of game management at the University of Wisconsin. Late in life he was appointed an advisor on conservation to the United Nations. But Aldo Leopold will always be remembered most for his essays — those lyrical sketches vividly describing the world of nature around him.

Here we present an excerpt from Aldo Leopold's most famous work, A Sand County Almanac. *In the depths of winter, reading "Sky Dance" will provide a glimpse of the delights of spring soon to come.*

I owned my farm for two years before learning that the sky dance is to be seen over my woods every evening in April and May. Since we discovered it, my family and I have been reluctant to miss even a single performance.

The show begins on the first warm evening in April at exactly 6:50 P.M. The curtain goes up one minute later each day until 1 June, when the time is 7:50. This sliding scale is dictated by vanity, the dancer demanding a romantic light intensity of exactly 0.05 foot-candles. Do not be late, and sit quietly, lest he fly away in a huff.

The stage props, like the opening hour, reflect the temperamental demands of the performer. The stage must be an open amphitheater in woods or brush, and in its center there must be a mossy spot, a streak of sterile sand, a bare outcrop of rock, or a bare roadway. Why the male woodcock should be such a stickler for a bare dance floor puzzled me at first, but I now think it is a matter of legs. The male woodcock's legs are short, and his struttings cannot be executed to advantage in dense grass or weeds, nor could his lady see them there. I have more woodcocks than most farmers because I have more mossy sand, too poor to support grass.

Knowing the place and the hour, you seat yourself under a bush to the east of the dance floor and wait, watching against the sunset for the woodcock's arrival. He flies in low from some neighboring thicket, alights on the bare moss, and at once begins the overture: a series of queer throaty peents spaced about two seconds apart, and sounding much like the summer call of the nighthawk.

Suddenly the peenting ceases and the bird flutters skyward in a series of wide spirals, emitting a musical twitter. Up and up he goes, the spirals steeper and smaller, the twittering louder and louder, until the performer is only a speck in the sky. Then, without warning, he tumbles like a crippled plane, giving voice in a soft liquid warble that a March bluebird might envy. At a few feet from the ground he levels off and returns to his peenting ground, usually to the exact spot where the performance began, and there resumes his peenting.

It is soon too dark to see the bird on the ground, but you can see his flights against the sky for an hour, which is the usual duration of the show. On moonlit nights, however, it may continue, at intervals, as long as the moon continues to shine.

At daybreak the whole show is repeated. In early April the final curtain falls at 5:15 A.M.; the time advances two minutes a day until June, when the performance closes for the year at 3:15. Why the disparity in sliding scale? Alas, I fear that even romance tires, for it takes only a fifth as much light to stop the sky dance at dawn as suffices to start it at sunset.

It is fortunate, perhaps, that no matter how intently one studies the hundred little dramas of the woods and meadows, one can never learn all of the salient facts about any one of them. What I do not yet know about the sky dance is: where is the lady, and just what part, if any, does she play? I often see two woodcocks on a peenting ground, and the two sometimes fly together, but they never peent together. Is the second bird the hen, or a rival male?

Another unknown: is the twitter vocal, or is it mechanical? My friend, Bill Feeney, once clapped a net over a peenting bird and removed his outer primary wing feathers; thereafter the bird peented and warbled, but twittered no more. But one such experiment is hardly conclusive.

Another unknown: up to what stage of nesting does the male continue the sky dance? My daughter once saw a bird peenting within twenty yards of a nest containing hatched eggshells, but was this his lady's nest? Or is this secretive fellow possibly bigamous without our ever having found it out? These, and many other questions, remain mysteries of the deepening dusk.

The drama of the sky dance is enacted nightly on hundreds of farms, the owners of which sigh for entertainment, but harbor the illusion that it is to be sought in theaters. They live on the land, but not by the land.

The woodcock is a living refutation of the theory that the utility of a game bird is to serve as a target, or to pose gracefully on a slice of toast. No one would rather hunt woodcock in October than I, but since learning of the sky dance I find myself calling one or two birds enough. I must be sure that, come April, there be no dearth of dancers in the sunset sky. □

From *A Sand County Almanac, with Other Essays on Conservation from Round River* by Aldo Leopold. Copyright © 1949, 1953, 1966, renewed 1977, 1981 by Oxford University Press, Inc. Reprinted by permission.

This captivating portrait of a sky dancer (left) by Louis Agassiz Fuertes is on permanent display at the Lab of Ornithology.

AMATEURS WELCOME

Richard E. Bonney, Jr.

Thumb through any field guide to the birds. Look at the range maps, those helpful pictures of North America that show the regions in which each species is found. Did you ever consider how those maps were created? In most cases, they were compiled from thousands of bird sightings made by ordinary bird watchers and reported in bird club newsletters or local bird journals.

Look through the 1990 issue of *Resident Bird Counts*, an annual supplement to the *Journal of Field Ornithology*. Inside you'll find the results of 96 Breeding Bird Censuses, annual bird-counting programs whose results have helped to quantify the decline of several North American species. Many of these counts are conducted not by professional ornithologists but by experienced birders putting their hobby to work for science.

Now pick up the Summer 1990 issue of *The Passenger Pigeon*, official journal of the Wisconsin Society for Ornithology. Here you'll find an extensive report on Wisconsin's 1989 fall migration, compiled by Mark S. Peterson, a professional nurse who studies birds in his spare time. And if you look at the Fall 1988 issue you'll find an article called "Some Unanswered Questions about Wisconsin Birdlife" by Samuel D. Robbins, a retired minister. According to *Passenger Pigeon* editor Stanley A. Temple, Robbins is often called the dean of Wisconsin bird watching, and this particular article has been used by the Wisconsin Department of Natural Resources to provide guidance to its bird research program.

These are just a few examples of the ways that nonscientists have furthered our growing understanding of the biology, ecology, and distribution of North America's birds. Indeed, without the multitude of dedicated birders who have reported their observations over the years, a tremendous amount of existing ornithological information would not be known, and many important ornithological projects now complete would have been impossible. Consider the New York State breeding bird atlas, a five-year project that pinpointed the breeding distribution of all New York's birds. All told, the effort involved over 4,300 volunteer observers who spent more than 200,000 hours covering 5,323 survey blocks and confirming 242 breeding species. Had these observers received minimum wage, their work would represent more than a million dollars' worth of data!

The fact that professional ornithology solicits the contributions of amateurs is not only fortunate but unusual. It's hard to imagine another branch of science, especially in this day of academic snobbery, that opens its arms to the public. Yet the history of ornithology on this continent is replete with the contributions of amateurs, starting right from the beginning with Alexander Wilson, often called the father of American ornithology.

Wilson's background is fascinating. A Scottish weaver and would-be poet, his political verse forced him to flee his native country in 1794. In 1804, after several years of struggling as a teacher and surveyor, he wrote a friend that he was going to make a collection of North American birds because bird watching had become one of his comforts in life, "a sort of rough Bone that amuses me when sated with [life's] dull drudgery." By 1808 he had published the first of nine volumes of his *American Ornithology*, the first comprehensive account of North American birdlife, based on his personal observations of nearly 300 species.

The history of ornithology is replete with the contributions of amateurs

Another preeminent early ornithologist was Elliott Coues, who studied birds while serving as assistant surgeon in the U. S. Army from 1864 to 1883. His penchant for cataloging led him to become one of the first authors to write authoritative accounts of western North American birdlife, and in 1884 he helped to found the American Ornithologists' Union. And the famous ornithologist Frank Chapman started out as a Manhattan banker who watched birds for fun and became angered by the bird plume fashion craze late in the last century—so angry that in 1887 he quit his job to fight for bird conservation. In 1899 he founded the magazine *Bird Lore*, predecessor of *Audubon* magazine, and by 1908 he had become curator of ornithology at the American Museum of Natural History.

Of course, the fact that amateurs contributed significantly to ornithological knowledge in the last century isn't too surprising. After all, during the dawn of American ornithology

A former Manhattan banker, Frank Chapman quit his job to fight for bird conservation.

Courtesy Department of Library Services, American Museum of Natural History there really weren't any professionals in the field. Far more extraordinary is the realization that amateur ornithologists continued to contribute important information throughout the 20th century as ornithology became a recognized discipline, complete with the trappings that render most scientific endeavors off limits to the layperson.

One of the most famous 20th-century amateurs was Margaret Morse Nice (1883–1974), about whom animal behaviorist Niko Tinbergen once said, "An American housewife was the greatest scholar of them all." It turns out that Nice bristled at being labeled a housewife; she had earned a master of arts from Clark University in 1926 and had studied some ornithology. Nevertheless, she had no degree in ornithology, no formal academic affiliation, no grants, yet by carefully watching the song sparrows in her Ohio backyard she made a major breakthrough in the methods of studying animal behavior. In 1937 she published her research in a now-classic book, *Studies in the Life History of the Song Sparrow*, which remains a model for such studies today.

Another important amateur was Arthur Cleveland Bent (1866–1954), who compiled 20 of the 23 volumes of *Life Histories of North American Birds* published by the Smithsonian Institution between 1919 and 1968. Bent was a successful New England businessman who specialized in managing utilities—electric power companies and manufacturers of printing presses and cotton mills, to name a few. He worked on his books in his spare time, corresponding with nearly 1,000 other bird watchers, mostly amateurs themselves, who contributed the bulk of the observations that went into his books. Today Bent's works are still among the most frequently consulted in ornithology libraries across the continent.

Another distinguished amateur is Harold Mayfield of Toledo, Ohio, the only person who has ever served as president of all three of ornithology's largest professional organizations. Before his retirement, Mayfield worked nine-to-five as a leader in the field of industrial relations. Avocationally, he was and still is an ornithologist par excellence. In 1960 he published a book called *The Kirtland's Warbler*, the definitive work on that species, which one year later won him the Brewster Medal, the highest honor in American ornithology. He also developed "The Mayfield Method" of measuring birds' nesting success, a technique that has been used since by hundreds of researchers. And these are just two of his dozens of ornithological accomplishments, for which in 1989 he was awarded the Arthur A. Allen Award for "outstanding contributions to ornithology."

Museum of Comparative Zoology, Harvard University © President and Fellows of Harvard College

The books of amateur ornithologist A. C. Bent are still frequently consulted by researchers.

Wilson, Nice, Bent, Mayfield—all these folks obviously devoted much of their lives to furthering our knowledge of birds. But you can join their ranks quite easily even if your time is limited. Thousands of volunteers participate each year in Project FeederWatch, the Breeding Bird Census, and the Winter Bird Population Study sponsored by the Cornell Lab of Ornithology; in the Christmas Bird Counts of the National Audubon Society; in the Breeding Bird Survey of the U. S. Fish and Wildlife Service; and in various shorebird surveys, hawk migration counts, bird banding programs, and atlas programs across the continent. All these efforts depend on volunteers for completion, and each one is vital in helping to document rising and falling bird populations, in developing maps of bird distribution, and in understanding birds' relationships to their habitats.

Intrigued? Ready to go beyond the field guide and become an amateur ornithologist yourself? This new column, which will appear in each future issue of the magazine, is designed to help you do so. We'll explore ways that you can participate in ongoing projects as part of a team; how you can watch birds on your own, keep careful records of what you see, and contribute your findings to large-scale data collection projects; and how you can design and conduct your own birding studies and, if your findings are significant, report them in an ornithological journal.

Maybe the Arthur A. Allen Award is in store for you someday! □

CONFESSIONS OF A LISTING HERETIC

Pete Dunne

Birding (like civilization) is founded upon the adherence to common standards and practices. It's what distinguishes us from the savages, from golfers, from people who cheat at solitaire. It makes life lists and Big Day scores and Christmas Bird Counts comparable from year to year, team to team, person to person.

What would we have if some birders went around spuriously counting red-legged black ducks as full species while other people up and decided that black ducks and mallards were conspecific?

Anarchy. That's what.

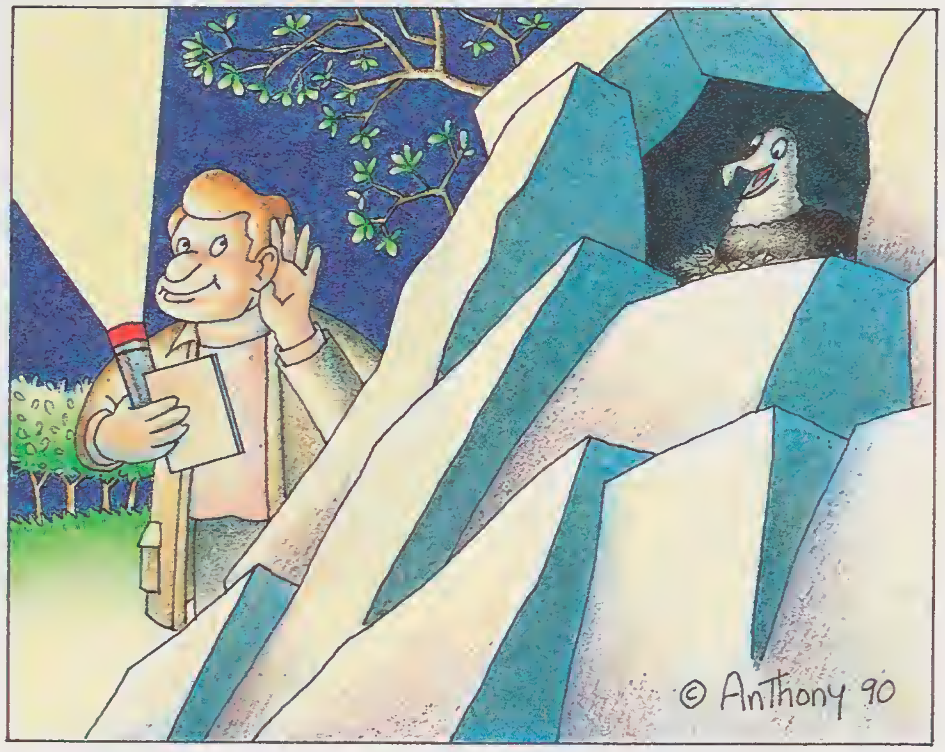
Would you want to be part of a world where green kingfishers seen on the Mexican side of the Rio Grande are counted, and where people slip outside the edge of their count circle to sneak a good bird onto a Christmas Bird Count?

You would not!

On the other hand, there's a lot of gray between black and white. Some of the rules governing what and how birds are counted are hard and fast. Others are open to interpretation, so that even the most ethical birders have hedged a wee bit for a good bird. Why, I have dear friends who have been downright heretical in swearing to the legitimacy of certain birds.

Take Cape May's former birder laureate and keeper of its bird list, Dr. Ernest Choate. For years Ernie carried a Manx shearwater on the Cape May list even though the bird was seen off the Lewes, Delaware, breakwater—12 long miles from Cape May. His rationale: We can count anything on the Cape May list that we can see from shore. On a clear day, we can see Lewes, Delaware. Therefore, we can count the bird.

Similar logic has led my good friend Clay Sutton to reinterpret the rules regulating the boundaries of the Cape May Christmas Bird Count circle. The northern limit passes through Goshen, New Jersey. From Goshen an observer can see Jakes Landing three miles away, and if you're as skilled as Clay you can identify hunting raptors at that distance. But, for the sake of accuracy, Clay makes it a point to go over and "ground truth" his observations.



ANTHONY TABER

Maybe it's the spirit of the season, but Christmas Bird Counts bring out the loose interpretationist in us all. How many "circles" bulge past those pure-hearted lines at key locations? Even the venerable Barnegat, New Jersey, CBC has half of Long Beach Island dangling off its southern rim. And in the best tradition of Christmas counts, some of the birds that are reported at the roundups would prompt Diogenes to blow his brains out.

I'm a practicing listing heretic myself, which gives me the right to throw stones. Once on the Wallpack Valley Christmas count I went out owling just before dawn. A heavy snow had fallen overnight, stopping at about 2:00 A.M. While I was driving—inside the count circle—my headlights picked up something lying in the road. Inspection disclosed a dead screech owl. The bird was lying fully atop the snow. *Therefore*, I reasoned, it had been killed after 2:00 A.M. *Therefore*, it had been alive and in the count circle when the count started at 12:00 midnight.

Screech owl. Check.

The black vulture claimed by the Guerrilla Birding Team during the 1988 World Series of Birding is another example of creative counting. The bird was nesting in a cave well out of our projected daytime route. If we wanted to get the bird a nocturnal visit was the only alternative, but we feared that approaching the cave would frighten or flush an adult brooding within—something we refused to do. Midnight found me 50 feet from the cave entrance, playing a flashlight in the trees above the cave, hoping to find a bird outside, at roost. But it wasn't to be. Then, just as I was about to leave, a loud *hissss* emanated from the cave. I left. With a smile.

Black vulture by call. Check.

This same spirit of concern for nesting birds is what led to an impromptu rule change in this year's World Series. A very accessible goshawk nest had become known to many of the event's participants and concern for the bird's welfare was mounting. To save the bird from harassment a ruling was made: Any team that knew the location of the nest need only drive to the site, park, wait three minutes, then drive away. The bird would count, sight unseen.

But the finest example of creative counting I have ever heard is credited to the venerable Floyd P. Wolfarth who, while hawk watching, saw a distant flock of brant suddenly break into two flocks, one of which disintegrated into chaos. His conclusion: Only two birds could have precipitated such a reaction—a golden eagle or a gyrfalcon. Any eagle would have been visible at that distance, but a gyr would not. Therefore . . .

And in late fall, when the Raccoon Ridge totals were posted, there it was. In black and white. □

TIM GALLAGHER

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Cornell Laboratory of Ornithology

BIRDSCOPE

The research newsletter of the Cornell Laboratory of Ornithology • Volume 5, Number 1 • Winter 1991

BPS Data Help Protect Wetland Birds

by Gregory S. Butcher, Director, Bird Population Studies

Millions of migratory birds depend on wetlands for food and shelter as they move between their wintering and breeding grounds. In the United States and its possessions, migratory birds are protected by a number of laws and treaties. Of particular importance to wetland birds is Section 404 of the Clean Water Act, which establishes a regulatory program regarding the discharge of dredged or fill material into U. S. waters, including wetlands.

The Clean Water Act's jurisdiction extends not only to wetlands connected or adjacent to navigable waters, but also to hundreds of thousands of acres across the United States that are considered "isolated" wetlands, having no direct surface connection to lakes, rivers, and other waterways.

The Office of Wetlands Protection of the U. S. Environmental Protection Agency (EPA) is concerned about protecting isolated wetlands utilized by migratory birds. Agency officials want to compile data that demonstrate the importance of isolated wetlands to these birds; such information would further support the application of the Clean Water Act to these wetlands. To this end, EPA asked the Lab's Bird Population Studies program (BPS), in conjunction with the Cadmus Group (an environmental consulting firm), to review computer databases and scientific literature for information on the value of isolated wetlands to migratory birds.

We first developed a master list of the different types of isolated wetlands. Each wetland type has characteristic vegetation and is found in a certain geographic region. We then identified the species of migratory birds found in each type of wetland. Next, we searched

(continued on page 2)

Tim Gallagher

The Northern Pintail is one of several species of waterfowl that depend on isolated wetlands for breeding sites. Their future depends on the protection of these areas.

Wetland Type	Common Migratory Birds
Prairie Potholes	Dabbling ducks; diving ducks; Pied-billed Grebe; American Bittern; Black-crowned Night-Heron; Sora; American Coot; Wilson's Phalarope; Black Tern; Yellow-headed Blackbird.
Playa Lakes	Waterfowl; Sandhill Crane.
Great Basin Lakes	Eared Grebe; White-faced Ibis; Black-necked Stilt; American Avocet; Wilson's Phalarope; Red-necked Phalarope; Franklin's Gull; California Gull; waterfowl; shorebirds.
Tundra Wetlands	Swans; geese; shorebirds; some songbirds.
Carolina Bays and Pocosins	Red-shouldered Hawk; Prairie Warbler; Prothonotary Warbler; Swainson's Warbler.

Around the Lab

◆ Production of a revised *Peterson Field Guide to Western Bird Sounds* is well under way at the Library of Natural Sounds (LNS). The new edition of this classic audio guide will feature many improved recordings and several species not included in the first edition, which was produced by LNS in 1963. Also, for the first time ever, the production will be available on compact disc as well as cassette tape. Watch for it at the Lab's Crow's Nest Birding Shop and other birding supply outlets in May, 1991.

◆ This summer, LNS again offers its popular one-week **course in natural sound recording**: June 8 to 15 at the San Francisco State University Sierra Nevada Field Research Station in California. Many previous participants have become significant contributors to LNS. For more details see the wrapper of this issue of *The Living Bird Quarterly* or write or call Greg Budney, curator, Library of Natural Sounds, CLO, 159 Sapsucker Woods Road, Ithaca, NY 14850; (607)254-2404.

◆ Bird Population Studies reports that 96 **Breeding Bird Censuses** and 32 **Winter Bird Population Studies** were conducted and sent to the Lab for editing and publishing this year. Bird numbers reported by both of these counts, known collectively as Resident Bird Counts, are up from last year, and even more important, several new long-term counts have been established which will eventually provide crucial data on bird population trends. Results of this year's counts will be published in the *Supplement to the Journal of Field Ornithology*, Vol. 62, No. 1, January 1991.
This winter, Resident Bird Count coordinator Rob Marshall will be updating the habitat classifications used for the counts so they will conform to nationally recognized habitat classifications. **For information on how to participate in Resident Bird Counts**, contact Rob at Bird Population Studies, CLO, 159 Sapsucker Woods Road, Ithaca, NY 14850; (607)254-2445.

Tim Gallagher

Wetlands also provide vital habitat for wading birds, such as this juvenile Black-crowned Night-Heron.

BPS Data

(continued)

databases to measure how frequently each species was found in each type of wetland, and also how abundant each species was. We used data from the Breeding Bird Census (a Lab-sponsored project that includes a number of censuses in wetlands over the past 50 years), Winter Bird Population Studies (the winter counterpart to the Breeding Bird Census) and more than 200 articles published by other scientists.

Isolated wetlands include such diverse habitats as the prairie potholes of North Dakota, arctic bogs, and the pocosins of South Carolina. These ecosystems are particularly susceptible to the pressures of human habitation: for example, farmers plow under pothole wetlands to increase their acreage, and suburban wetlands are filled to make way for subdivisions and light industry. Using the information provided by BPS and other organizations, EPA hopes to ensure that isolated wetlands that serve as habitat for migratory birds are protected from uncontrolled development.

Some examples are listed in the table of isolated wetlands and the migratory birds that depend on them. BPS is compiling a more detailed report for EPA. By documenting the importance of isolated wetlands to hundreds of species, and to hundreds of thousands of individual birds, BPS is providing vital support to the efforts to protect these habitats for future generations. ◆

News from The Library of Natural Sounds

The Library of Natural Sounds (LNS) continues to grow at an astounding speed. To support this growth, LNS recently received a grant of $450,000 from the National Science Foundation (NSF), to be awarded over three years.

The funds will be used in several ways. First, LNS will provide a fully equipped studio for visiting recordists, a critical need because of the increasing number of bird recordings we are now receiving from field ornithologists. Second, LNS will purchase state-of-the-art digital studio recorders, making our library the first and only archiving facility for bird sounds having both analog and digital recording capabilities. Digital recording is a comparatively new technology, and LNS will be testing the feasibility of using digital tapes for long-term storage.

Finally, LNS will equip a first-class audio testing and maintenance studio. The scientists who reviewed the NSF grant proposal were unanimous in their praise of the library, in particular for its excellent standards and unfailing support to the natural sound recording community.

Among the many new recordings deposited in the LNS collection this year, a few deserve special notice: From Japan, the sounds of the Black-footed Albatross and the rare Short-tailed Albatross (recordings by Hiroshi Hasegawa); from Brazil, the sounds of the never-before recorded Rufous Potoo and White-winged Potoo (recordings by Rob Bierregard, Mario Cohn-Haft, and Ted Parker).

And among the many visitors using the LNS collection this year was Fulbright scholar Dr. Hassan Felemban of Abdul-Aziz University in Jeddah, Saudi Arabia. Dr. Felemban used recordings of Saudi Arabian and Omani bird species deposited in the LNS collection by Ben King, Lab Associate and author of the *Field Guide to Birds of Southeast Asia*. ◆

News from The Bioacoustics Research Program

The Bioacoustics Research Program (BRP) has completed its move into renovated quarters adjacent to LNS. The move facilitates communication between BRP and LNS and provides the bioacousticians with quarters more comfortable than their former office trailer. Other news: Bioacoustics director Christopher Clark and Cornell professor Ronald Hoy of the Section of Neurobiology and Behavior will be teaching a brand-new college course in animal and human acoustics this spring. The course's weekly labs will be conducted in the new facility and will analyze recordings from LNS.

Also, through a private donation, a sophisticated acoustic analysis system is being installed in the LNS visitors studio. The system is based on an Apple MacIntosh IIFX computer, and Apple Computer Inc. has donated three computer systems that are being used for development of the sound analysis programs described in the Fall/Winter 1989 issue of *Birdscope*. These programs are being funded by NSF and will be distributed to the bioacoustics research community at minimal cost as part of BRP's efforts to promote and support studies on bird songs and calls.

Finally, as a result of the NSF grant, support from bioacoustics researchers in the Cornell University College of Engineering has increased dramatically. Three labs in engineering are now actively working on hardware and software projects that will have direct application toward the acoustic censusing and monitoring of birds. ◆

Tim Gallagher

John Bower of BRP tries out one of the new computers donated by Apple Computer Inc. The computers will be used in a sophisticated new sound analysis system.

Notice something different about this issue of ***Birdscope***? The research newsletter of the lab of Ornithology is now coming to you as part of *The Living Bird Quarterly*. This change enables us to publish ***Birdscope*** three times a year instead of two, and at a considerable savings – so more of your membership dollars can go to support our bird research programs.

Around the Lab

◆ In the last issue of *Birdscope* (Vol. 4, No. 1, Spring/Summer 1990), **Duncan Macdonald** was inadvertently omitted from a list of the Lab Associates who contribute recordings to LNS. Our apologies, Duncan. Also, Bernie Krause is no longer a Lab Associate; his name should not have been included.

◆ **Big BirdWatch '91** will take place on May 18. On that day the Sapsuckers, the Lab's big day birding team, will return to New Jersey for the World Series of Birding. At the same time, teams of Lab members across the country will conduct their own 24-hour birding marathons for fun, prizes, and to help support the Lab. Set the date aside for a birding adventure! Watch your mailbox for details.

◆ **Charles R. Smith**, director of special projects, recently received three grants: $32,083 from the New York State Department of Environmental Conservation and the U.S. Fish and Wildlife Service to make an evaluation of piping plover nest success and management needs on Long Island, New York; $11,995 from the U.S. Forest Service to study species diversity and habitat associations for the breeding birds of the Finger Lakes National Forest, New York; and $2,600 from the U.S. Department of Agriculture to study distributions of breeding birds of New York State in relation to landscape patterns and agricultural land use.

◆ **Christopher W. Clark**, director of the Bioacoustics Research Program, spoke at the Fifth Conference on the Biology of the Bowhead Whale in Anchorage, Alaska, last April. He presented four invited papers, including one on passive acoustic location and tracking methods for spring-migrating bowheads. In June, Chris journeyed to the Netherlands as a U.S. delegate to the 1990 meeting of the International Whaling Commission Scientific Committee.

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Quarterly

Spring 1991

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Scope Review ▪ Photoessay: Pelicans ▪ Ibis Cafeteria ▪ Bewick's Wren ▪ Watching: Crows ▪ South American Field Guides

SUMMER 1990
Listing the Piping Pl ird Trade ▪ When Monogamy Isn't ▪ Eaglestone Mayfield

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SPRING 1990
Yellowstone Fires ▪ Platte River Conservationist ▪ Red-billed Hornbills of Africa ▪ Best of the AOU ▪ Ding Darling National Wildlife Refuge ▪ South Texas Wildlife Corridor

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Should We Feed Birds in Winter? ▪ Oil Spill ▪ On Ancient Wings: The Archaeopteryx ▪ Australia ▪ Bird Watchers of China ▪ Memory Tricks for Field Marks

AUTUMN 1989
Artist Louis Agassiz Fuertes ▪ Red-cockaded Woodpecker ▪ Review: Bird Feeders ▪ Trans-Pacific Migration ▪ Wood Stork ▪ Watching: Mockingbirds

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THE LIVING BIRD
Quarterly

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Front cover: An adult green-backed heron manages to look elegant even while incubating her eggs. Common and widely distributed, the small waders tend their young for a month after hatching, feeding them a diet of regurgitated fish. Photograph by Larry R. Ditto.
Back cover: *Schmawk!* A young green-backed heron lets out a resounding bellow. When it molts, this youngster will assume the striking colors of the bird on our front cover. Photograph by Mark J. Bilak.
Right: A drake tufted duck shows off its distinctive crest to full advantage. Each year one or two of these stunning European ducks show up at Central Park's reservoir. Photograph by Jeff Foott.

FEATURES

10 **BIRDING CENTRAL PARK** *by Fred Baumgarten*
In the heart of downtown Manhattan, this world-renowned urban park is a magnet for birds and bird watchers.

16 **PARTNERS IN CONSERVATION** *by Charles R. Smith*
What do grassland birds and dairy cows have in common? They're both home on the range in an unusual national forest.

22 **ONE COOL CUSTOMER** *by John Alcock*
In parching desert heat, nesting mourning doves actually cool down their eggs while incubating them.

28 **SAVE OUR SHEARWATERS!** *by Mark J. Rauzon*
Disoriented by city lights, young shearwaters crash from the nighttime sky on Kauai. But never fear, help is on the way.

DEPARTMENTS

4 **159 SAPSUCKER WOODS ROAD**

5 **BIRDNOTES**

6 **FLYING FIELD** *by Roger Swain*
When it comes to sharing blueberries with people who grow them, birds have no sense of fair play.

8 **BEYOND THE FIELD GUIDE** *by Richard E. Bonney, Jr.*
How can you make your birding observations more meaningful to science? Simply by keeping detailed notes in a journal.

34 **SPOTLIGHT** *by David Wilcove*
With its stunning blue plumage and size, the hyacinth macaw is unforgettable. But human activities threaten its survival.

36 **CRITICS' CORNER**
In this issue a book and two handy birding gadgets come under the careful scrutiny of our product reviewers.

38 **THE CATBIRD SEAT** *by Pete Dunne*
What's a birder to do when confronted by a stranger who completely rejects the basic tenets of the faith?

p. 10 Central Park vagrant

. . . and Now You Know the Rest of the Story

I enjoyed Tim Fitzharris's pelican photos ("Crazy Old Men in Baseball Caps," Autumn 1990). Not only was Tim sharing his stunning photos with us, he was incidentally documenting the return of these wonderful birds to an area in Texas that has been devoid of them for many years. While the article refers to brown pelicans as "year-round Gulf Coast residents," they are in fact only "year-round" on the southern part of the Texas Coast. Several years ago, however, a couple dozen birds showed up at Bolivar Flats, farther to the north . . . and in 1990 over a thousand birds could be seen at High Island and other favored roosting areas. We hope that the population will outgrow its nesting areas along the southern Texas coast and reinvade the upper coast.

Robert A. Behrstock
Houston, Texas

Good Spot!

I was intrigued by Ted Levin's article about the bald eagle along the Connecticut River ("Dead Birds Don't Fly," Autumn 1990). In May I was in New England to do some birding. Driving up I-91 to Woodstock, we spotted an eagle on a power pole near one of the lakes. I wonder if this was Ted's eagle?

Ralph A. Fisher, Jr.
Silver City, New Mexico

Of Feathers and Photos

In the Autumn 1990 issue, the lower photo on p. 35 ("Of Suits and Feathers") is not a willow ptarmigan. While a willow's tail coverts would be white, the tail feathers beneath would be black or dark brown with white tips. I believe enough of the tail feathers show in this photo to make this determination.

John Austin
Missoula, Montana

A ptarmigan's white upper tail coverts are surprisingly long, extending to the tips of the tail feathers. The bird in question has its tail rather furled; I would be hard pressed to say whether the tail feathers are showing at all. Living in Montana, however, you probably have more experience with ptarmigans than I do. Thank you for looking at the magazine so closely.

Kevin McGowan, Technical Editor

Not a Trashy Magazine

NO, NO, NO! *The Living Bird Quarterly* does not need a heavy paper mailing wrapper. We have enough paper and trash to dispose of each day. Come on now, put your ads *inside* the magazine and put the address sticker *on* the magazine.

D.E. McGill
Philadelphia, Pennsylvania ·

We mail TLBQ *in a wrapper not to provide ad space but to protect the cover from U.S. Postal Service "handling." In our pre-wrapper days, we got many complaints about shredded magazines.*

Get Rid of the Gloss

I am disturbed that you print *The Living Bird Quarterly* on glossy paper. Glossy catalogs and magazines pose an unresolved problem for recycling. I enjoy the colorful photographs but we must relinquish this pleasure for the Earth's sake. A magazine like yours should use either recycled paper or a form of newsprint that may be recycled easily.

Betty J. Cooke
Springville, New York

On the one hand, we want to do the right thing environmentally and minimize unnecessary additions to landfills. On the other hand, an attractive magazine is a highly effective tool for gaining converts to the cause of conservation.

Though it is unfortunate that you can't take TLBQ *to your local recycling center at present, we understand that another type of recycling is taking place: readers pass their back issues along to friends. Meanwhile, we are searching for a glossy recycled paper that will provide the same high level of reproduction quality our readers have come to expect.*

GREETINGS FROM SAPSUCKER WOODS

One thing I noticed about Sapsucker Woods right from the start is how much it changes from day to day. I never know what to expect each morning when I look out my office window. The weather, the light, the foliage, the bird life—everything changes here. Already in the few short months since I moved east from California I've seen Sapsucker Woods turn from the lush green of summer to blazing autumn foliage, then turn again to the starkness of winter, with the ground draped in a dense blanket of snow. And now the first buds and leaves are breaking out, heralding the return of spring.

My office, with its breathtaking view of the pond and surrounding woods, is a great fringe benefit of working at the Lab. The bird life on the other side of the glass is always varied and plentiful. The down side is that it's sometimes hard to get any work done with so many interesting things to look at outside!

The other major fringe benefit of being at the Lab is getting to know the people who work here. They're all bird fanatics, though some of them didn't start out that way. It's impossible to work here for long without succumbing to the birding bug. Support personnel, secretaries, custodial staff—people who may not have known a rock wren from a Rhode Island red when they first came to work at the Lab—maintain lists of the birds they see and rush out to catch a glimpse whenever a rarity shows up in the Lab garden.

The professional bird fanatics at the Lab (a.k.a. ornithologists) have the fever just as bad. The other day I phoned Bird Population Studies to see if anyone there wanted to take a look at the sharp-shinned hawk perched in the shrubbery near my office. I barely got the message out when the phone dropped and the line went dead. Two minutes later a half-dozen people—the entire department—crowded into my office, binoculars in hand. It seems they all needed the bird for their year lists.

I feel very lucky to be working with such friendly and interesting people in a place as beautiful as Sapsucker Woods. And I look forward to a long tenure as editor of *The Living Bird Quarterly*, helping to produce a magazine that we can all, Lab staff and members alike, be proud of.

Tim Gallagher, Editor

We welcome letters from readers. Address letters to:

The Editors
The Living Bird Quarterly
159 Sapsucker Woods Road
Ithaca, New York 14850

Electronic BirdNet

First came the hotline—making the most up-to-date information on localized bird sightings just a phone call away. Now the National Birding Hotline Cooperative (NBHC) gives you the same information and more, faster and cheaper—through your computer.

The new hotline cooperative is the brainchild of Norm Saunders and Chuck Williams, two self-described avid birders and computer bulletin board operators. They're offering subscribers the transcripts of major birding hotlines from the East Coast, West Coast, and central United States. Electronic birders can access the hotline transcripts through two public access bulletin boards: The Osprey's Nest Bulletin Board and the Southern Arizona Birding Bulletin Board. The hotline is also available through BITNET/INTERNET, a computer network that serves most of the nation's colleges and universities, many state and federal agencies, and some research institutions.

NBHC seeks more local bulletin boards on which to post the hotlines, as many birders don't have access to BITNET/INTERNET. The organization also welcomes volunteers who can provide hotline transcripts from their areas. For more information on either volunteering or subscribing, contact Norm Saunders, BITNET: NYS@NIHCU; Bulletin Board: (301) 989–9036.

Adopt a Pothole

It's damp, muddy, and definitely not cuddly—but the North American Wildlife Foundation (NAWF) wants you to adopt one anyway. The orphan is the prairie pothole, prime duck habitat that's being destroyed at an alarming rate on central United States and Canadian farmlands. As the tiny, scattered ponds disappear, so do the ducks; populations have been declining steadily since the 1950s.

TIM GALLAGHER

Potholes provide vital breeding areas for green-winged teal and other North American ducks.

Almost all potholes are on private agricultural lands. Farmers have no incentive to protect the miniature marshes, so they often drain them and plow them under, says Crawford Jenkins, director of the NAWF Prairie Farming Program. "A pothole in a field adds to the cost of equipment operation and produces no income . . . yet the pothole is still taxed. As farmland, it can at least cover the taxes."

To encourage farmers to preserve the habitat where 95 percent of all prairie ducks are raised, NAWF has set up a program through which you can adopt your very own pothole. In return for a contribution, pothole patrons receive a certificate, a picture of their pothole, and annual reports on the ducks that are using it. The landowner is paid for not farming the pothole and also receives a sign announcing the pothole's adoption.

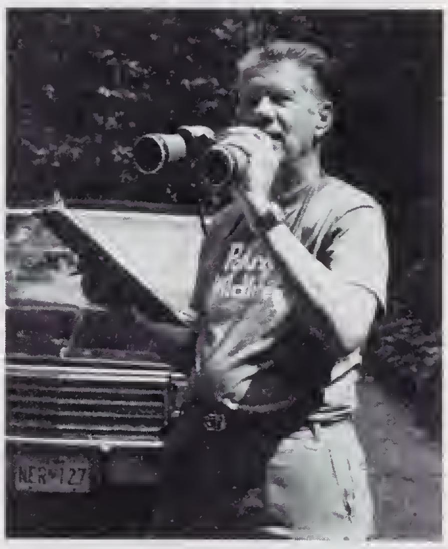
NAWF is an Illinois-based nonprofit organization that exists to enhance the knowledge of waterfowl and wetlands. For more information on their innovative duck conservation strategy, contact the North American Wildlife Foundation/Adopt A Pothole, 102 Wilmot Road, Suite 410, Deerfield, Illinois 60015.

Mono Lake Lives

The Mono Lake Committee's 12-year effort to save a salty lake from death by diversion has paid off. Last autumn, for the first time in 50 years, water flowed in all five of the tributaries that supply the unique desert lake. Conservationists are optimistic that Mono's water level will now rise, guaranteeing that the lake will be preserved as a vital stopover for millions of migratory birds. High water will also keep predatory coyotes away from the island that serves as the primary nesting site for the California gull.

The City of Los Angeles began diverting water from Mono's feeder streams in 1941. After an additional aqueduct was constructed in 1970, the lake's water level fell at an alarming rate. The increasingly salty water could no longer support the tiny brine shrimp relished by most of the birds that visit the lake. But since that time the Mono Lake Committee—described by *Audubon* magazine as "a textbook example of excellence in grassroots activism"—and other conservation organizations have worked tirelessly to persuade the city's Department of Water and Power (DWP) to reduce the diversions.

Those efforts have succeeded. A court injunction imposed last August requires Los Angeles to maintain water in Mono Lake at a level high enough to protect the wildlife that depends on it. Early in October, Mono Lake Committee members watched as a DWP worker turned the valves that released water into Parker Creek, the last of the lake's tributaries to have its flow restored.


BARBARA DOWELL (USFWS)

Chandler S. Robbins, birding ace

Birding's Top Gun

Chandler S. Robbins received the 1991 Chuck Yeager Award for his exemplary accomplishments in the study of birds and their habitat. Robbins, a U.S. Fish and Wildlife Service (USFWS) biologist widely known for his development of a nationwide bird population monitoring program, is a former member of the Cornell Lab of Ornithology's administrative board and a coauthor of the immensely popular Golden Field Guide, *Birds of North America*. The award is sponsored by the National Fish and Wildlife Foundation (NFWF).

Why is a conservation award named for a famous aviator? "The Chuck Yeager Award recognizes individuals who make a difference on the ground" in fish and wildlife conservation efforts, explains General Yeager, who serves on the board of NFWF. "Mere bureaucratic service won't do it—we want to recognize people who make it work in the field."

The award brings Robbins, a 44-year veteran of USFWS, a $15,000 grant which he is free to apply to any conservation project he chooses.

JOHN J. SMITH

BLUE BIRDFOOD

Roger B. Swain

Last summer's big concern was the disappearance of trees. Rainforests got most of the press. The news magazines all ran pictures of loggers working in the Pacific Northwest—big saws, big trunks freshly felled. The photographs of the Amazon Basin were smoke-filled, tongues of orange fire licking the slash and leaving behind cemeteries of charred black stumps.

There was much heated rhetoric about imports and exports and saving the jobs of the tree cutters. About the only issue on which everyone agreed was that wood is too precious to be going up in flames. The thermometer outside my kitchen window read hotter than usual, as if to record the intensity of this debate. And some people wonder whether we are feeling the heat of the tropical conflagrations themselves.

Perhaps we are. Bird census-takers —the sort of bird watchers who keep track not only of what they see but how many—have been reporting a drop in the numbers of summer songbirds. And because so many of our birds (40 percent of North American species) migrate to and from the tropics each year, it is easy to blame this decline on the torching of their winter homes. Those who have studied these birds in Central and South America report that the winter arrivals, from indigo buntings to yellow-bellied sapsuckers, not only set up winter feeding territories but return each year to the same ones. Clear-cutting, as the critics point out, consumes more than cellulose.

Of course, not everyone is convinced that it is the chop-chop of axe and machete that is drowning out the dawn chorus. Science is seldom so cut-and-dried. What I have learned from 25 years on this wooded New England hillside is that making a hole in the forest can sometimes lead to an avian excess. Witness the fact that our family is doing such a brisk business in blue birdfood.

Ours has been a case study not of the effects of an encompassing deforestation on birds but of reforestation, of trees growing up while we struggle to keep them cut down. Our hundred-acre farm is located halfway up one side of North Pack Monadnock, a 2,257-foot mountain in southern New Hampshire. At one time 85 percent of this entire state was cleared for human use. But the soil the early residents uncovered when they stripped away the oaks and chestnuts was—and still is—shallow, acid, and stony. It's the sort of ground that wears out spirits as well as tools, and once the deeper, sweeter, rock-free lands of the west were opened, these glacier-scraped hills were abandoned.

Among the first native shrubs to spring back up, once the plowing and grazing stopped, were blueberries: lowbush on the drier ground, highbush in the swamps. For the families left behind by the westward migration, the wild harvest must have been some consolation. At least it was a change from picking stones. The old and young took to the hills every summer. Some, I have heard, could remove the fruit so fast that a steady stream of blue fell into their baskets and pails.

With the arrival of the railroad in 1874, blueberry picking became big business. The storekeepers provided the wagons, drove the pickers to the foot of the mountain in the morning, brought them back in the afternoon, and purchased and packaged the berries they had gathered. Records for 1892 show that 1,200 crates of berries were shipped to Boston, fattening the local economy by $1,000.

In 1905, a USDA botanist from Washington, D.C., named Frederick V. Coville began summering here with his family. The next year he began his famous experiments on growing and improving blueberries, research that led to today's commercial industry. It was Dr. Coville who discovered that blueberries not only like but require soil with a pH of 4.0–5.2. And it was Dr. Coville who began to breed better blueberries. He started with a highbush berry of particularly fine flavor that he found in a brushy, mountain pasture and named 'Brooks' after the owner of the land. He crossed this with an early-bearing lowbush named 'Russell' from another nearby farm. Every muffin, every pancake made today from cultivated berries contains a little of this first blue blood.

When we moved to this farm 25 years ago, the entire top of North Pack Monadnock was still open land, for sheep had been pastured there until the 1938 hurricane. Low stone walls crisscrossed hundreds of acres of blueberries, and crowds of people made pilgrimages up the mountain to pick. In the years since, however, chokecherry and gray birch have been steadily seeding in. Red maples and white pines now shade even the highest blueberry bushes, and it is mostly hikers who use the trail. In another generation or two, the trees will be so tall that even the views will be gone.

On our own land, on the mountain's shoulder, we have spent much of our free time maintaining a state of "arrested succession"—a condition intermediate between hayfield and oak forest in which blueberries can thrive. Remove an adolescent white pine, let sunlight fall on a 50-year-old blueberry bush, and it will flower and bear fruit again. Keeping the forest at bay is hot, pitchy work, but in the early years there was always the solace of pie. True, some years were more bountiful than others, depending on the harshness of the winter or whether it rained when the blueberries were in flower and kept the bumblebees from pollinating the pinkish-white bells. But lately the weather hasn't mattered. The bushes can be heavy with green fruit in June, yet there will be precious little to pick come July. It isn't that we have fewer bushes. In fact, we have been planting some of Dr. Coville's better descendants. But we once put 50 or 75 quarts of blueberries in the freezer each summer, and now we have to scramble to find 10.

This birdfood business was headed for a total absence of blueberry muffins on our breakfast table

The problem is birds. To human taste buds a blueberry doesn't reach full flavor until a week after it has turned completely blue. Avian palates must differ from ours; birds start harvesting the fruit as soon as it begins to ripen. Flocks of robins, rufous-sided towhees, catbirds, and blue jays fill our bushes. We've counted hermit thrushes, wood thrushes, brown thrashers, flickers, and cedar waxwings. Even if we don't see them feeding, we can tell where birds have been dining by the blue droppings.

We like birds. They are, after all, the natural disseminators of blueberries, raspberries, and other small fruits. And one of the reasons we encourage vigorous thickets on our land is that they in turn encourage wildlife. We will never tire of spotting bluebirds, scarlet tanagers, or northern orioles no matter what they are feeding on. Nor do we begrudge sharing the harvest with ruffed grouse, or the newly returned wild turkeys.

But birds don't know much about sharing. This spring we did a little calculating and concluded that this birdfood business of ours was headed straight for a total absence of blueberry muffins on our breakfast table. The problem is that the blueberries the birds used to feed on higher up the mountain are now so shaded by trees that the birds must concentrate on the few fruiting patches that are left, namely ours. Given time, birds and blueberries will no doubt come to equilibrium. But in the meantime I have more than once been tempted to reach for that premier bird-studying instrument of years past—the double-barreled shotgun. Scarecrows don't work, cannons are too noisy, and we never were willing to spray a chemical that was said to make the berries taste bad to birds. The description alone did the same for us.

The solution we have resorted to is netting; 17-foot-wide lengths of black polypropylene with a ¾-inch mesh, joined at the edges with a lacing of baling twine. Because the netting catches on berries the way shirt buttons do on a loose-knit sweater, and because birds could still stand on it and peck through, we have it supported by a grove of 6-foot-high ash poles linked by wires at the top. Log sections seal the edges of the net to the ground. Our blueberry patch now looks like some great environmental sculpture.

We couldn't afford to cover all our blueberries, even if we wanted to. The netting is strung over the descendants of Dr. Coville. We are leaving their wild antecedents to their traditional pickers—the birds. We will have to take the netting down before winter and put it up again next summer to extend its life. But judging from the way we feel now, no one will complain about the chore. Not when inside the netting the blueberries can ripen in peace. They stay there until they fall off of their own overripeness if we choose.

What has been saved by this protective envelope, we have discovered, has been more than our breakfast. Yes, we are looking forward to bigger and bigger harvests as the hybrid bushes under the netting reach full size. But more importantly we find that, on our own land, at least, we have turned down the heat on the issue of whether the world belongs to us or the birds. Biologists, economists, loggers, and bird watchers will continue to debate the consequences of cutting down trees. And we, not without sawdust on our hands, will be joining in. But now, in what promises again to be a long, hot summer of controversy, we intend to sit back and enjoy our private cease-fire. □

Roger Swain is science editor of *Horticulture* magazine and author of the forthcoming book, *Saving Graces: Sojourns of a Backyard Biologist.*

WRITE ON

Richard E. Bonney, Jr.

I remember the morning well. It was early spring, 1981, with lifting fog and smell of earth. The season's first bird songs had lured me out of bed, and I was tramping through the state forest behind my home looking for early migrants. Around 8:00 A.M. I had just started back toward the house when I heard a strange song, one I knew I'd heard before but couldn't place. Slowly I crept toward the bird until I could see it silhouetted against the sky, perched atop a large shrub. At first I thought it was an indigo bunting singing a weird song, but after a harder look I realized that the bird was a blue grosbeak, a species I knew well from the South but had never before seen in Upstate New York.

As it turns out, very few people had, perhaps only one. For no good reason I didn't think to look up the bird's status right away, but several months later I was perusing *Birds of New York State* by John Bull and read this: "As far as I am aware, the only Upstate report of a blue grosbeak with details is that of a male observed near Lake Champlain on June 17, 1964."

Wow! I thought. My blue grosbeak had been a *really* good bird. I should have reported it. I should *still* report it. When had I seen it? Let's see, it was late April—or was it early May? Already I couldn't remember. And not only had I neglected to record the date, I hadn't recorded any information about the bird at all—so even if I could reconstruct the timing, I had no documentation that would prove to anyone other than myself that a blue grosbeak had decided to visit Willseyville, New York, in the spring of 1981.

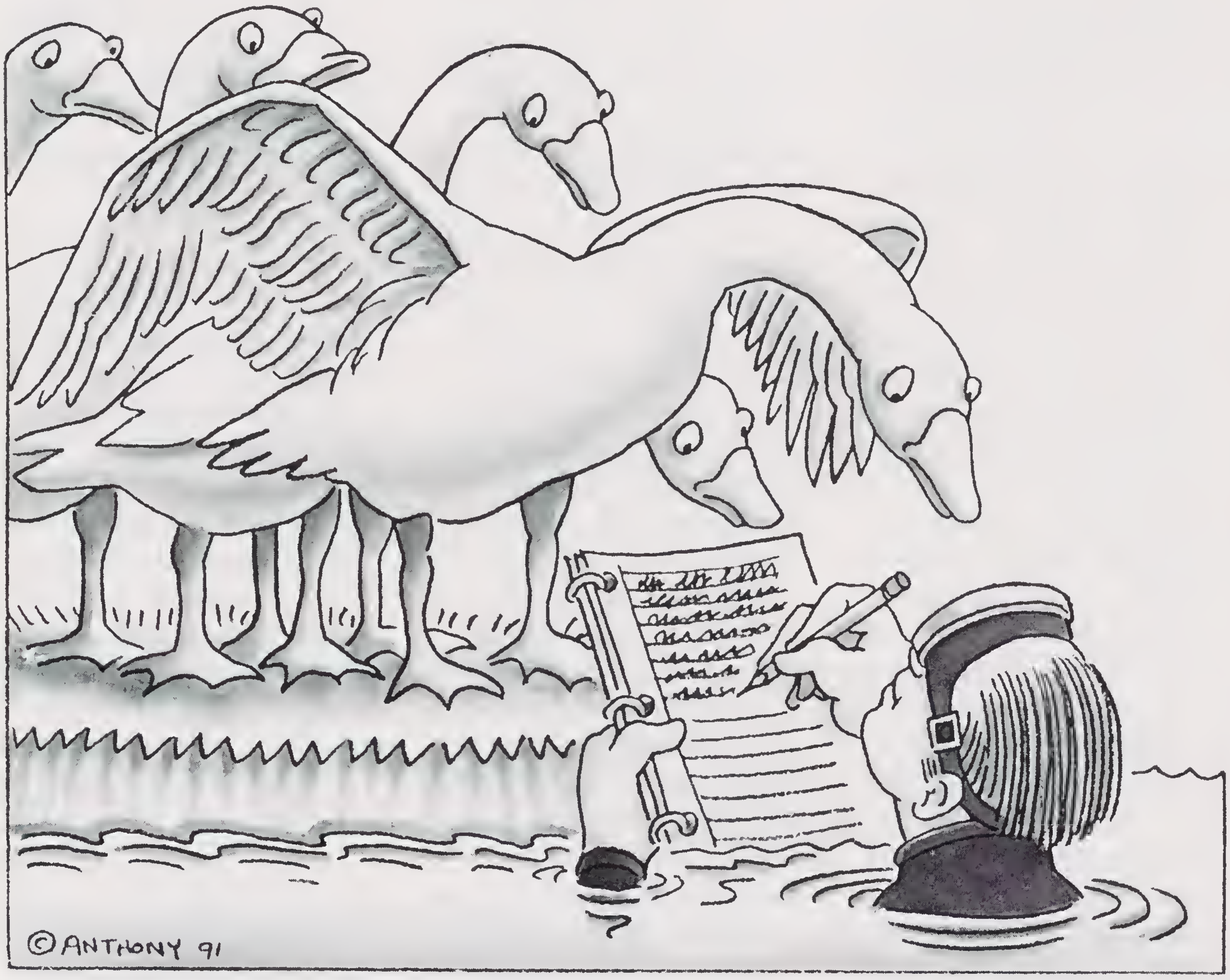
The moral is quite simple: Take field notes!

Now, recording field notes may seem like a burden to you. Perhaps you don't care about documenting your bird sightings, even rare ones. But the fact is, such observations have scientific value. My sighting, for example, would have been useful to ornithologist Janet Carroll when she compiled information on the spread of the blue grosbeak into New York for the state's breeding bird atlas, published in 1988—that is, it would have been useful had it been properly documented and recorded.

What's more, it's not just rare or unusual sightings that warrant documentation. Even lists of birds common to particular localities, if the lists are made carefully and include numbers of birds seen, have scientific value. Bird populations are constantly changing, and their ups and downs often reflect changes in the environment. Only when birders meticulously record the numbers of birds seen at various localities can these changes be properly documented, so that scientists can begin to look for patterns and try to interpret what the changing populations mean.

Besides, taking field notes is fun. Recording notes improves your powers of observation, and the notes help you to relive your field experiences later. For example, my field notes from a trip to the Everglades in 1986 tell me that on March 15, at 11:05 A.M., I saw a snail kite hunting over the marsh behind the Miccosukee Restaurant—an entry that immediately recalls the smell of coffee and refried beans.

Once convinced, what should you actually write about your forays into the field? The nature of your field notes will depend to some extent upon their intended purpose, but in most cases, a journal-style recording of your observations should prove sufficient. Include the following information:



ANTHONY TABER

Waterproof ink is best, but you can use a pencil.

date (day, month, year), time of day, location (distance and compass direction from nearest town, name of county, state, and country if you're abroad), weather conditions, and persons with you, if any. Then, simply write down what you see — species, numbers, ages, sexes, other identifying characteristics.

> *You can never tell what seemingly unimportant facts may later become decisive*

Your observations of unusual birds should be as detailed as possible, because validation of such sightings may depend on your notes. For example, your report of a rare bird on a May Day count will typically be accepted or rejected by a jury based on the accuracy and completeness of your field description. So record details of color, plumage, and behavior, as well as the conditions under which you're making the sighting, such as lighting and approximate distance from the bird. You might even make a quick sketch.

Besides recording the species you see and their descriptions, you may want to describe the birds' behaviors. If you find a nest, for example, you might wish to observe it and record the birds' activities over a period of time. Accurate field notes about behavior are just as critical as detailed descriptions of bird sightings. For the field biologist, behavioral notes serve as the source of data for learning how a bird relates to its environment, just as laboratory experiments provide the database for a physical scientist.

Take complete notes! You can never tell what seemingly unimportant facts may later become decisive. Greg Butcher, director of Bird Population Studies here at the Cornell Lab of Ornithology, tells about watching what he thought was a hooded oriole singing in Niantic, Connecticut. The song sounded funny, though, so he recorded it on paper, syllable by syllable. Later on he discovered the exact same description of an oriole's song in his field guide — and learned that his bird had actually been a first-year male orchard oriole.

One enjoyable way to learn a lot about individual species is to keep species accounts. That is, transfer observations from your field notebook into another notebook that you've organized by species. Then all your observations about a particular species, for example, the black-capped chickadee, will be grouped together. A loose-leaf notebook is the best choice for this effort, as it allows you to add pages to your existing notes on each species. If you follow this procedure for a few species that interest you particularly, it won't be long before you become an expert on those species.

A few nuts-and-bolts considerations: You can keep your notes in a loose-leaf notebook or in a bound notebook. Waterproof ink is best, but you can use pencil. If you do use ink, select paper with a high rag content; it will hold the ink better and will not yellow with age. You'll also need a technical pen with a tip of approximately 0.35 mm; pens that draw a narrower line are too likely to clog. (Note: Such pens are available at art supply stores. Keep them in plastic bags, especially when traveling, to contain leaks!)

If you hate writing in the field as much as I do, here's another idea. Take along a cassette recorder, speak your stream of consciousness into it, then transcribe your notes after you get home. The new microcassettes that fit in a pocket are great for this purpose. Warning number one: I have a whole shelf full of untranscribed cassettes, and when I need to refer back to a specific incident it can take me a while to find the right tape. Still, that's better than having no notes at all. Warning number two: Cassette recorders break and batteries fail, sometimes unbeknownst to you. Pencil points can always be sharpened with your teeth.

Finally, no matter what technology you decide upon to take notes, at all times follow these three rules: Record your observations as soon as possible after making them. Don't consult references before making field notes. And never change your notes; these are records of your observations and should remain as you first made them.

Now, what are you going to do with all this dutifully recorded information? For starters, get in the habit of reporting your sightings to your local bird club, which will probably use them when updating local and regional checklists. You might even want to file your daily checklists with the club. The value of your lists will increase with time, because such lists provide important baseline data for detecting population changes. Information from a number of observers — you and your fellow club members — over a broad area can serve as an early warning signal that a formerly abundant species is experiencing a serious population decline.

Also, many journals produced by state bird organizations welcome carefully documented reports for publication. Your local bird club can probably put you in touch with the regional editor for your locality. And, if you live near a city, county, state, or national park or any other sanctuary or refuge, check with officials there to see if they would like reports of your sightings for maintaining their checklists.

Finally, if you begin keeping detailed species accounts, you will probably accumulate enough information to write short reports on those species for the aforementioned publications, particularly if you pick species that have not been well studied. You can become a regional expert! □

For the address of the bird club nearest you, or to find out the address of your state's bird journal, write to the Lab of Ornithology's Education and Information Services, 159 Sapsucker Woods Road, Ithaca, New York 14850. And if you are editor of your club's newsletter, please send a copy to the same address. We want to make sure you're on our list — and we want to ensure that our library is receiving copies of every bird newsletter produced in North America so we can monitor the progress of volunteer-assisted research projects.

More information about the value of and methods for keeping notes is available in *The Naturalist's Field Journal*, by Steven G. Herman (Buteo Books, Rte. 1, Box 242, Shipman, Virginia 22971).

TERESA ELLINGTON

BIRDING CENTRAL PARK

Briefcase-toting birders take a new kind of power lunch

Fred Baumgarten

A Venetian gondola, a wandering fiddler, and a black-crowned night-heron: what do they have in common? They are all part of the same scene — a late-spring day at the Boathouse in America's oldest and greatest urban playground, New York's Central Park. Here visitors ride across the boating lake in svelte sloops, complete with singing gondoliers. Others on shore listen to a superb impromptu performance by a local violinist, one of countless street musicians who ply the paths of Central Park in search of eager listeners and a day's wages. The sleek night-heron, clad in elegant black, gray, and white plumage, sits quietly on a fence in the early afternoon sun, admired by a group of us who have just finished walking through some of the richest birding territory on the East Coast.

As we sit wolfing down the last of our lunches we can see the fiery red of the adult night-heron's eyes without even using binoculars. Around the boating lake, black-crowned night herons are ubiquitous and easy to approach — qualities greatly appreciated by bird watchers.

We are part of a rapidly growing birding army that is becoming as much a part of Central Park as the joggers, loungers, street people, softball players, and lovers — in short, the tens of thousands of New Yorkers and others who visit this huge playground annually, many by simply stepping out of their apartment-house doors.

Central Park is truly the center and the pulse of the Big Apple. Its 840 mostly green acres form a perfect rectangle in the middle of Manhattan Island. From almost any point in the park, you can see the surrounding metal and glass post-modernist towers of downtown Manhattan. But in its carefully manicured lawns, wooded knolls, and glass-smooth lakes you can also find tranquility, solitude, and birds.

Yes, birds. And not just the rock doves, house sparrows, and starlings you would expect to find in a large, sprawling metropolis. Over 270 species have been seen in Central Park, and that number includes a few surprisingly out-of-place visitors, such as Iceland gull, tufted duck, chuck-will's-widow, long-eared owl, and red-necked grebe.

Though Central Park has interesting birds all year long, it doesn't truly come into its own until spring migration. To songbirds making their annual journey northward to breed, the park must appear as an enormous green welcome mat spread out before them. A human "migrant" approaching New York's La Guardia Airport from the west gets precisely the same impression flying over the park.

Late March brings the first trickle of birders — the small, loyal cadre whose regular beat is the park. I first joined their ranks when I came to work for the Na-

BHL

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MASLOWSKI PHOTO

Jamaica Bay attracts a variety of waterfowl, including the canvasback, wigeon, gadwall, and mallard ducks pictured here.

NEW YORK CITY'S OTHER BIRDING HOT SPOT

Though Central Park is fantastic, no birding excursion to the Big Apple would be complete without a visit to Jamaica Bay Wildlife Refuge. Part of the Gateway National Recreation Area at the entrance to New York Harbor, this 9,155-acre man-made sanctuary is one of the top birding spots in the Northeast. The refuge bird list boasts 321 species, including such surprising Eurasian vagrants as the little stint, curlew sandpiper, and ruff, as well as the sharp-tailed sandpiper and rufous-necked stint from Siberia.

Jamaica Bay Wildlife Refuge is a productive mixture of open saltwater bay, salt marsh, freshwater ponds, and mudflats. There are also trees, shrubs, and grasses, many of them planted by former refuge manager Herbert Johnson during the 1950s and 1960s. Thanks to Johnson's foresight, the refuge now provides habitat for a wide range of birds—gulls, waterfowl, herons, terns, shorebirds, land birds, and raptors. Though Jamaica Bay is worth visiting any time of year, birding is particularly good during the spring and fall when the area virtually swarms with migrants. It's possible to see 90 to 100 species in one day during the peak of migration.

Four man-made ponds at the refuge provide freshwater habitat for various waterfowl, egrets, herons, ibises, and other birds that nest there. The refuge staff keeps the water level low in East Pond from late June through November each year to uncover rich mudflats where migrating shorebirds can rest and forage. This practice is one of the things that makes the sanctuary such an excellent spot for shorebird watching. High tide is the best time to look for shorebirds here, not because the tides have anything to do with the water levels in the small freshwater ponds, but because the incoming tides inundate the saltwater mudflats the birds usually frequent, forcing them to look elsewhere for a place to feed or rest. The drained pond is the best place available. To take full advantage of this situation, pick up a tide chart at a fishing supply shop or look up the daily high tides in a newspaper.

Keep an eye out for hunting falcons in the early fall. Both merlins and peregrine falcons show up routinely at this time, making dazzling aerial attacks on shorebird flocks. To watch a falcon working a flock of shorebirds is to witness one of the most spectacular sights in nature, with both predator and prey performing at the peak of their aerial abilities. The birds in a harried flock move in such close unison they appear at times to meld into a single organism, rising or turning as one to avoid a determined predator's power dive.

Winter is a good time to go owling at the refuge. Short-eared owls are often seen at this time of year, swooping low over the marshes at dawn and dusk in pursuit of small rodents. If more than one is present, you may see them interact with each other, flying around together or calling back and forth with their unique screeching bark. With luck, you may spot one of those rare ghosts from the arctic, a snowy owl. One or two show up most winters. Be sure to check the groves of cedars and pines for saw-whet owls. Winter is also good for waterfowl in the ponds and bay. Canvasbacks, greater scaups, buffleheads, red-breasted mergansers, common goldeneyes, and others can all be seen there. At times the bay teems with flocks of brant.

During late spring and summer Jamaica Bay hosts a number of interesting breeding birds—glossy ibises, American oystercatchers, green-backed and little blue herons, common moorhens, pied-billed grebes, great and snowy egrets, black skimmers, terns, willets, and various waterfowl.

To reach Jamaica Bay Wildlife Refuge from John F. Kennedy Airport, drive west on State Highway 27 for two miles, then south on Cross Bay Boulevard until you arrive at the entrance. You'll need a permit to enter the refuge, but you can pick one up free of charge in the interpretive building at the park entrance. —*T.G.*

tional Audubon Society, which is headquartered a few blocks away.

Leaving work at five o'clock sharp, I rush to the park's southeast corner at Fifth Avenue and 59th Street. As I walk through the park the din of the city recedes rapidly, replaced by an amazingly bucolic scene. On a glass-smooth pond, a few mallards bob around, while red-winged blackbirds set up shop in the cattails. My route takes me past a graceful footbridge and around Wollman Skating Rink, which developer extraordinaire Donald Trump repaired in a few months—something the city government failed to do after spending millions of dollars and several years in the attempt.

Walking briskly past the Mall, a pleasant open area, I reach the Lake, where in a few short months the Boathouse will host long lines of pleasure-seekers waiting to rent rowboats. The beautiful cast-iron and wood Bow Bridge takes me across the Lake and into the Ramble. Artfully conceived to be the park's "wildest" section, this small parcel of land features meandering footpaths and cul-de-sacs, hummocks and rocky outcroppings, pools and watercourses. It is a tribute to the vision of the park's creators, landscape designer Frederick Law Olmsted and architect Calvert Vaux, who, between 1858 and 1878, turned an undistinguished, swampy landscape into a playground for rich and poor alike.

Naturalists and would-be naturalists have enjoyed the park ever since. John Muir made it to Central Park in 1893, finding solace from failing health late in his life. New York's raucous former mayor Ed Koch joined the binocular set for a tour several years ago, saving his highest praise for the feisty catbirds—though, as far as I know, none of those mimids repeated Koch's oft-heard phrase, "How'm I doing?"

Reflecting the character of its 19th century design, Central Park is a charming mixture of Victorian structures, manicured lawns, and picturesque vistas. But the Ramble, with its unique vegetation, ranging from full-grown shade trees to tangles of invasive weeds, provides birdlife with a special haven and attracts the requisite numbers of insects for travel-weary birds. To see 25 warbler species in one morning is not unusual at the height of migration. Many birders come to the park in spring and fall just to get a look at these colorful jewels—diamonds in the rough city.

Bird watchers of every stripe converge on the Ramble in spring. In fact, by mid-season a morning there looks like a birding convention. Groups of up to 30 birders pass each other on the dirt paths, exchanging cursory greetings and bird sightings before moving on. At times, a competitive edge rules as each group hopes to be the first to spot a mourning warbler skulking in cover or a broad-winged hawk skimming just above the treetops. Attentive beginners crowd around guides from the Linnaean Society (New York's oldest birding club) or the Audubon Society.

The local birders are an easy-going lot, in marked contrast to the stereotypical brusque urbanite. Some bird watchers, clad in pressed suits and with briefcases in hand, may look like the latter, but the field glasses around their necks are a sure sign I'll hear word of a pine warbler singing in the willows or a red-bellied woodpecker down by the Azalea Pond.

A few years ago, a chuck-will's-widow plopped down in the middle of a maple tree in the Ramble, and stayed for two weeks—or so some birders claimed. Other park "regulars," ever ready to demonstrate their birding skills, maintained that the bird (silent, of course) was a whip-poor-will. This baffling nightjar seemed to combine the characteristics of both species

TIM GALLAGHER (2)

As summer arrives, the birding fades and the human extravaganza of Central Park comes to life. A local jazz band (above) performs an impromptu concert for appreciative passersby. Dancing skaters (below left) add to the colorful spectacle. Birders must either wait till fall migration or join in the fun.

TIM FITZHARRIS

in equal measure. Debate raged along the Ramble's paths like small brush fires, but by the time a consensus was reached the mysterious visitor was gone.

The incident taught me something about Central Park birders. You get to know them as well as, or maybe even better than, the birds. They are as varied a lot as you would expect to find in Gotham — loners who peruse the Ramble nearly every day and keep detailed lists, popular leaders with a knack for honing in on the most sought-after birds, or socializers who find a familiar face as satisfying as a solitary vireo.

One spring day I varied my usual itinerary so I would end up on a grassy knoll with large oak trees at the park's western edge. The area is a favorite meeting place for dog owners out walking their pets, but I was there because a red-headed woodpecker had been frequenting the big trees since late winter. After a careful search, I was finally rewarded with a glimpse of the bird, looking dapper in its bright, crimson-headed adult plumage.

Many times after work I hurry to Central Park's Reservoir before the light fades. Part of an elaborate system of reservoirs that quench New York City's enormous appetite for water, the Reservoir bisects the park's eastern half. Rafts of ruddy ducks and gulls and smaller flocks of scaups are regularly seen there. And for more than five consecutive years, one or two tufted ducks — rare Eurasian stragglers best distinguished from the similar scaup by their solid black backs — have also shown up.

A slender asphalt walkway and a wire fence surround this irregularly shaped body of water. To see the birds you have to run a gauntlet of hard-nosed joggers, then press yourself flat against the fence, lest you get trampled. As an alternative you can put your back to the fence and study the fascinating variety of *Homo sapiens* who pass by in their endless pursuit of fitness. They come in all sizes, shapes, and ages, huffing and puffing or flapping their arms, intent on completing at least one circuit of the Reservoir (about 1 1/2 miles). Birders don't have to endure such an enforced regimen of exercise; we break into a sweat just chasing a gray-cheeked thrush.

As spring melts into summer the birding fare fades and the human extravaganza takes over. Throngs of natives and tourists sunbathe in the Sheep Meadow, jam the Delacorte Theater for free Shakespeare performances, or picnic on the great lawn while being serenaded by Metropolitan Opera stars (and also by foraging nighthawks). Children watch the sea lions in the Central Park Zoo, and teenagers whiz by on their bicycles. The other, more familiar park — the people's park — comes to life. Birders must either wait out the month or two until autumn or else join in the park's gaiety.

Many find fall birding in Central Park almost the equal of spring. Warblers still line the Ramble's paths. Cherry Hill, just below the Lake, makes a fine vantage point to spy southbound sharp-shinned hawks and other migrant raptors. Yellow-bellied sapsuckers do their quiet work on the trees surrounding Strawberry Fields, a peaceful garden dedicated to John Lennon.

One of my own most memorable birding experiences, however, did not take place in spring or fall, but rather on a cold, gray afternoon in early winter. On a tip from a fellow birder, I diverged from my usual routine and skirted the Ramble, arriving at a quiet stand of pine trees beside the Delacorte Theater. There, perched calmly on a branch, sat a long-eared owl, unnoticed by anyone except a few hearty, admiring birders. Busy New Yorkers scurried by, oblivious to the sleepy-eyed predator.

That owl remains etched in my mind's eye. Somehow this bird of the deep forest had found its way into a small pocket of woodland carefully preserved in the heart of the steel and concrete edifice known as New York. Will the owl, along with other reminders of our natural heritage, be able to acclimate itself to the unnatural world we have created? Or will it vanish and in so doing become a poignant reminder of the need to slow down and take stock of our increasingly unfeeling urban ways? It's hard to say. But as long as there are birds to be seen in Central Park, birders will utilize it. Their growing presence in the park serves as both a testament and a hope that in the colorful pursuit of birding we can bring out and preserve the very best that the city has to offer. □

Fred Baumgarten is a writer, a conservationist, and the editor of *Audubon Activist,* a monthly environmental action newspaper published by the National Audubon Society.

ARTHUR MORRIS/BIRDS AS ART (2)

Late March brings out the first groups of birders searching for spring migrants (above). A park visitor photographed a whip-poor-will (right) as it slept in a tree at the Ramble. This long-eared owl (above left) found refuge in the heart of the steel and concrete city.

The local birders are an easy-going lot, in marked contrast to the stereotypical brusque urbanite

Partners in Conservation

Charles R. Smith

Biologists, Forest Service land managers, and dairy cows join forces to preserve grasslands

The day was crisp and clear, with a light northwest breeze that blew gently against my face. Though it was the first of June, the wind still carried a chill from Lake Ontario. The trees behind me were clothed in the fresh, green leaves of late spring, not yet dulled by the heat of summer or nibbled by the jaws of countless caterpillars. I stood at the edge of a hilltop pasture with my field assistant, Elizabeth Domingue. In the distance to the west we could see the long silvery ribbon of Seneca Lake, the largest of the Finger Lakes of Upstate New York, as we scanned the open pasture with our binoculars and listened intently. Then we heard our quarry's faint, distinctive song, barely an avian hiccup, a simple, dry *tsi-lik*. After patient searching we finally were able to locate our subject, a single Henslow's sparrow. Our field season had begun.

As I watched the sparrow, my thoughts drifted back to my earliest inkling of the potential for this research project. I was attending an annual meeting of the newly formed Society for Conservation Biology at Davis, California, in 1988. I already had given my own paper on the effectiveness of breeding bird atlasing. Now I was relaxed enough to concentrate on other presentations. I was especially impressed by Jack Ward Thomas, a career wildlife biologist with the U.S. Forest Service (USFS) who later headed the Service's select technical committee on conservation of the spotted owl. Thomas outlined the research opportunities that existed on national forest lands.

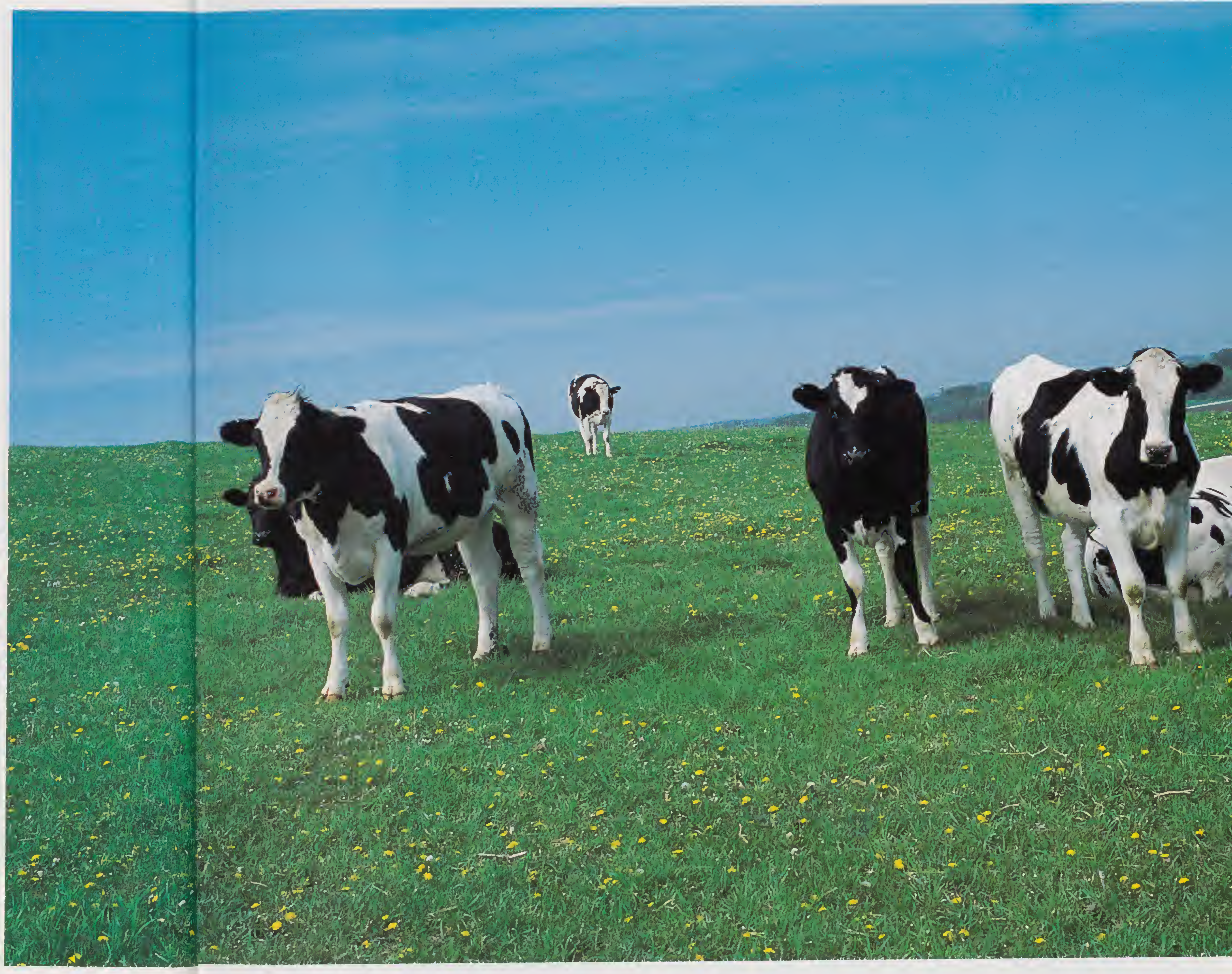
MASLOWSKI PHOTO

Louis Pasteur once observed, "In the art of scientific investigation, chance favors the prepared mind." I had been considering conducting research in a national forest not far from Cornell University in Ithaca, New York, where I am a research ecologist at the Laboratory of Ornithology and teach in the Department of Natural Resources. Thomas's talk was a serendipitous event that encouraged me to pursue the idea further.

When I returned to Ithaca, I made an appointment to talk with Hilary Dustin, the District Ranger in charge of Finger Lakes National Forest (FLNF). She listened enthusiastically to my ideas, explaining that the Forest Service needed more information about FLNF bird populations immediately in order to make management decisions. No organized bird studies had been done in the area before, so we decided to concentrate our first field season on the breeding birds of pastures and at the same time to undertake a general survey of the breeding bird species diversity of the entire area. We chose to focus on pastures because their relatively simple vegetation structure made observing birds much easier than in other habitats — and because some of my own research at other sites already had revealed that many grassland bird species were declining in New York.

The FLNF is the only national forest in New York State. The lands have been managed by the federal government for nearly 50 years, first as the Hector Land Use Area (named for a small town on the edge of the public lands) before receiving full-fledged status as a national forest in 1985. Remarkably, the sequence of historical events that brought me here to

JOE STANSKI/MORNING STAR PHOTO



The declining Henslow's sparrow (left) persists in Upstate New York largely because a long-standing policy permits livestock grazing on public land. Holstein cows are the unwitting collaborators in this grassland conservation effort.

CHARLES R. SMITH

Cornell researcher Charles Smith found that grassland birds have varying habitat preferences. Eastern meadowlarks (far right) favor large pastures; grasshopper sparrows (below) accept smaller pastures overgrown with some goldenrod. When pastures reach this overgrown state (right) they lose their appeal for grassland birds.

MASLOWSKI PHOTO

study the Henslow's sparrow had its roots in the Great Depression. During that period, hundreds of thousands of acres of marginal farmland were sold to state and federal governments or given up in lieu of taxes. In New York State, those farmlands became wildlife management areas and state forests. And nearly 14,000 acres, perched on a gently rolling ridge between Seneca and Cayuga Lakes, eventually became the Finger Lakes National Forest. FLNF is a Forest Service multiple-use area, managed for timber harvest, hunting, fishing, hiking, camping, horseback riding, bird watching, and grazing of livestock. Yes, livestock grazing — FLNF is one of the few national forests east of the Mississippi managed as active rangeland, with nearly 4,000 acres of pasture leased for cattle grazing from May through October each year. The cattle grazed on these public lands are mostly young Holsteins, being conditioned before they take their places in productive dairy herds.

Were it not for the decision made in the 1930s to maintain the pastures on these hilltop public lands for grazing, it is unlikely there would be Henslow's sparrows or any other grassland birds here for us to study. The land would have followed a predictable succession, from pasture to fields of goldenrods and asters to shrublands and eventually to upland forest. But instead we found ourselves in a good position to undertake studies of the Henslow's sparrow and other grassland birds on nearly 4,000 acres of pasture with full cooperation and funding support from the USFS.

Our study was a practical one. The economics of a declining state dairy industry were forcing land managers at FLNF to re-evaluate the decades-old use of public lands for grazing. Yet FLNF managers knew that their pastures provided both cattle and wildlife with significant habitat not found elsewhere on public lands. Under the provisions of the National Forest Management Act of 1976, all national forests must be managed in ways that will not diminish biodiversity — the variety of plants and animals they support. So before allowing pasture to revert to forest, the managers needed more information about the effects such a change might have on wildlife, and in particular on the breeding birds of the area.

My students and I set out to gather data that USFS managers would need to make their decisions. An important part of my job at Cornell is teaching undergraduates who are pursuing careers in forest and wildlife management. I feel it is essential for my students to participate in research projects, so they can gain practical field experience before graduating. I also like to focus on practical questions that will provide resource managers with the information they need to conserve birds and other wildlife. The FLNF project was an ideal opportunity to do research that would help the USFS meet its management goals and also involve students in meaningful field studies.

My assistants on the FLNF grassland birds project, Elizabeth Domingue and Donald Smith, were Cornell undergraduates majoring in wildlife ecology. Together we designed a research program to determine which bird species were using the pastures. In addition, we wanted to know how a pasture's size and quality affected the kinds and numbers of birds found there. During the summer, we used standard bird censusing techniques to survey the pastures of FLNF, identifying and counting all the birds we saw. The pastures ranged in size from scarcely 25 acres to over 300 acres. We found that some of these pastures produced taller, thicker stands of grass than others, which often had been invaded by goldenrods.

We were impressed (and sometimes a bit intimi-

ROBERT VILLANI

dated) by the insatiable curiosity of the dairy cattle that shared their pastures with us, following us about with curious stares while we worked. We found that the cattle developed a taste for the colorful plastic surveyor's tape we used to mark our study areas. Relocating previously marked sampling points after our bovine associates had visited them was a daily chore.

As our summer unfolded, we found that the pastures of FLNF were rich with grassland birds. This was exciting news, for another of my research projects had revealed that most of the grassland birds found in New York had experienced dramatic declines since the mid-1960s. The eastern meadowlark, for example, though still widespread in New York, had declined 80 percent in the past 25 years. And both Henslow's and grasshopper sparrows are now listed by the New York State Department of Environmental Conservation as "species of special concern" because of their rarity. These sparrows, along with most other grassland birds, retreated from New England to New York as Yankee farms were abandoned for factories and the landscape regained its original forest cover. In New York State, on the other hand, 30 percent of the land is still farmed, so grassland birds persist in the state's pastures and hayfields — although their populations are dwindling.

LARRY R. DITTO

Henslow's sparrows require spacious tallgrass pastures, but the bobolink (above), one of the most abundant pasture birds, is not so choosy. Such findings help the U.S. Forest Service make practical decisions about how public land is used.

Savannah sparrows were another subject of our study. As our work progressed, we discovered that savannah sparrows weren't picky: they used pastures of all sizes and quality, and along with bobolinks were among the most numerous pasture birds. Eastern meadowlarks were more particular than the savannah sparrows, favoring larger pastures, 50 or more acres in size.

We focused our attention, however, on grasshopper and Henslow's sparrows. Detailed studies of the habitat requirements of these two species became the subject of Donald Smith's senior honors thesis. He determined that the Henslow's sparrow was a real specialist: it preferred high-quality, tall-grass pastures at least 70 acres in size. The grasshopper sparrow, not quite so demanding as Henslow's, accepted slightly smaller pastures with shorter grass and scattered clumps of goldenrods. The rather specialized requirements of the Henslow's sparrow may explain why it is declining in abundance throughout much of its range. In 1987, the U.S. Fish and Wildlife Service listed the Henslow's sparrow among its "species of management concern" in the United States.

Our studies provided helpful guidance and encouragement to USFS biologists. Their decades of pasture management have paid off, conserving a variety of grassland birds that represent most of the rare and declining species known to occur in New York and other northeastern states. We determined that some of the smaller, less productive pastures of FLNF could be allowed to revert to shrublands, if necessary, without significantly compromising the variety or abundance of grassland birds in the national forest. And we concluded that FLNF was regionally significant in providing habitat for a group of grassland birds showing widespread declines in our area.

A research biologist, USFS, New York's dairy farmers, college students — for this project we were all partners in conservation. The Forest Service provided a management plan that maintained habitat for grassland birds, as well as funds for the necessary studies. The dairy farmers provided the long-term economic incentive to maintain pastures on FLNF. And my students and I collected information that enabled the managers to formulate their plans and make practical management decisions.

My work at FLNF is now in its third year. The two undergraduates who first worked with me have gone on to graduate studies in wildlife management, Elizabeth Domingue O'Neill at Purdue, Donald Smith at the University of Arizona. My studies of the birds at FLNF took on a new dimension as volunteer observers became involved in the project, helping to make up for the recent cutbacks in state and federal funding for such basic studies. And we've counted more than 120 species of summer birds at FLNF — that's nearly half of the 242 reported breeding bird species in New York, and it includes a high proportion of neotropical migrant songbirds, a group currently of considerable interest to conservationists. Our list also includes some local rarities such as upland sandpipers and hooded warblers. Not bad for 14,000 acres of abandoned farmland and the combination of chance events that led a group of prepared minds to begin studies there. □

Charles R. Smith is a research ecologist at the Lab of Ornithology, a naturalist, and a conservationist who teaches at Cornell University. In addition, he advises New York State agencies on matters related to conservation and management of nongame birds.

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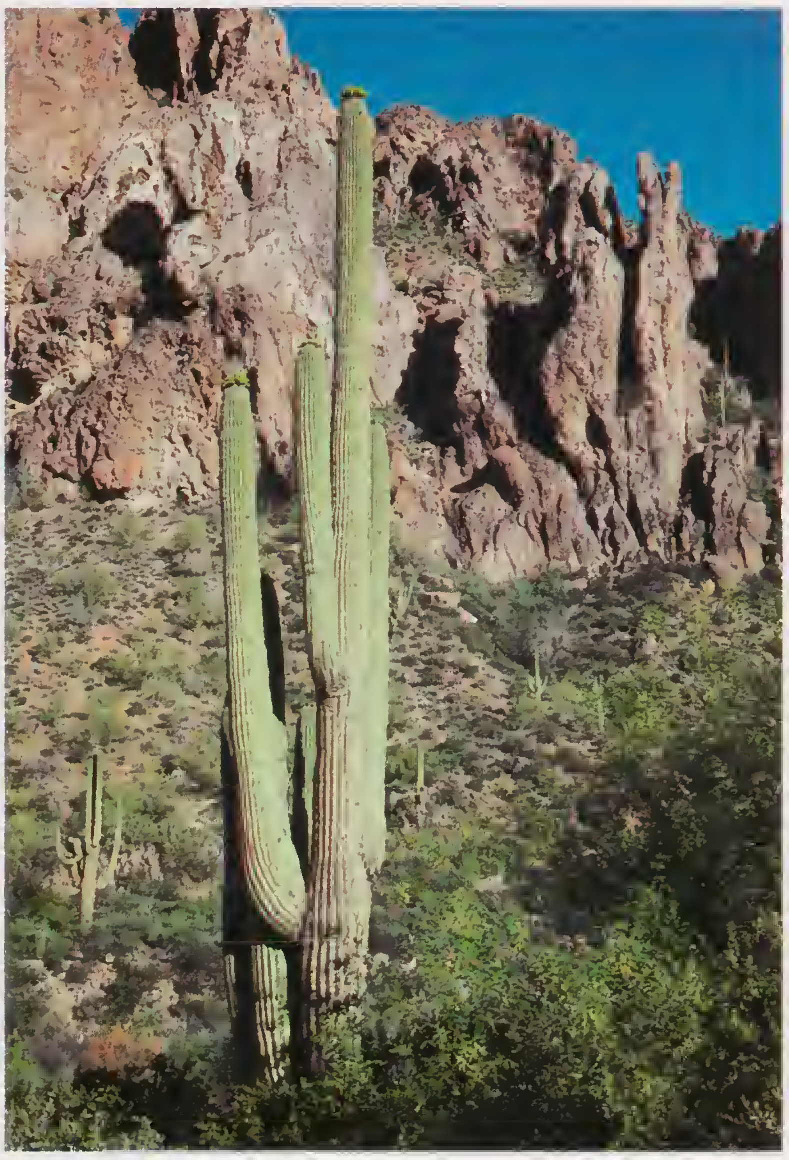
One Cool Customer

John Alcock

Under the scorching sun of an Arizona summer, mourning doves keep cool and collected



It is midafternoon on a parched June day in Randolph Canyon, Arizona. The ephemeral stream that drains this part of the Superstition Wilderness Area gave up the ghost months ago. Today the sands in the dry wash almost crackle with heat; it is as if flames are about to burst from the streambed.

Within a stand of mesquites sustained by reservoirs of moist soil far underground, the day is slightly more liveable although no matter how you cut it, it is still 111 degrees Fahrenheit in the shade. Arizonans talk about how dry their heat is, but their enthusiasm for this claim is born of necessity rather than conviction.

A verdin somewhere downstream gives a half-hearted chip and shuts up again. A whiptail lizard dashes from one patch of shade to another, sprinting across the sunsoaked gravel as if its feet were on fire.

On a forked limb of one of the mesquites a mourning dove has fashioned its minimal nest. A twig here, a twig there, a half-hearted concoction if ever there was one, just barely cupped enough to retain the two eggs that from past experience I know are balanced on the cross-laid scaffolding of the nest. At this moment I cannot see the nest or eggs because they are hidden beneath the body of an incubating mourning dove.

Now just a second. The mourning dove is incubating its eggs when the temperature is 111 degrees? I thought the point of incubation was to transfer heat from the body of the parent bird to the eggs on which it sits. For me the male emperor penguin is the epitome of incubation as he stands stoically in an Antarctic blizzard, having made a nest of his feet for an egg he covers with a brood patch on his belly. The brood patch, a swath of bare skin, conveys the heat of the male's body to the egg, keeping it warm and alive in an utterly frigid environment.

Although the importance of heat transfer may be most obvious for emperor penguins, incubating birds of many species develop a brood patch on their bellies around the time that eggs appear in their nests. On the nest, an incubating bird wiggles downward in such a way as to push apart the feathers that cover its brood patch, which it then presses over the eggs. A

Deep waterholes in drying streambeds (far left) sustain doves and other wildlife through the long, hot summer. High desert temperatures would kill developing embryos if not for the mourning dove's unique mechanism for cooling its eggs (left).

JOHN ALCOCK (2)

typical bird, and the mourning dove qualifies, usually maintains a core temperature considerably higher than our own familiar 98.6 degrees. Therefore the brood patch acts as a kind of hot water bottle and in most places, not just Antarctica, incubation has the effect of warming the eggs substantially. Raise an egg's temperature to 103 or so and key chemical reactions take place more rapidly within the egg, promoting speedy development of the embryo. Cool the egg and development slows.

So why is the dove bothering to remain on its eggs when the air temperature is over 103 degrees? Wouldn't this be a good time for the adult to do a little feeding in the shade of some mesquite trees? Or to go for a drink at one of the *tinajas* (natural water holes) upstream and around the bend? A few of the deeper depressions, cut into solid red rock in this part of the streambed, still hold water collected during the winter and early spring when runoff flowed down the drainage and into the tanks and beyond. Even though they are both depleted and polluted by the cattle the U. S. Forest Service permits in this "wilderness" area, the *tinajas* sustain the local doves and other wildlife.

I take a long pull from my canteen, glad I don't have to rely on the hot, scummy water in the nearby tanks. The dove just sits there, pressing its brood patch tightly against its eggs. It stares out into space, its eyes unblinking, its beak open, its throat quivering noticeably as if it were in a state of terminal panic. The bird must see me but seems determined to stay put.

I now know why the bird stayed put, thanks to the curiosity of my colleague at Arizona State University, Glenn Walsberg, and his co-worker, Kathy Voss-Roberts. They were intrigued by the ability of mourning doves to bring off clutches of eggs in the Arizona midsummer because they knew how acutely sensitive bird eggs are to overheating. Although cool temperatures slow embryonic development, they do not kill the embryo, whereas even fairly brief exposure to temperatures in the neighborhood of 110 degrees Fahrenheit spells the end for most developing bird embryos. Therefore Walsberg and Voss-Roberts wondered if, under some circumstances, mourning doves might actually be cooling, rather than warming, their eggs by brooding them.

They gathered key data on this paradoxical idea by inserting sensitive temperature-recording devices into and onto mourning dove eggs to monitor their internal and external temperature over the course of some brutally hot summer days in central Arizona. During their experiments air temperatures hovered around 113 degrees Fahrenheit between 2:00 P.M. and 6:00 P.M. — the hottest part of the day. This is suffocating heat, no matter how low the humidity.

Despite astronomical air temperatures, internal egg temperatures during this time averaged only 104 degrees — a significant reduction if another six degrees or so would kill the developing embryos. Although no one has checked the temperature tolerance of mourning dove eggs directly, judging from information on other birds, a mourning dove that left its nest unattended for even half an hour on a scorching June afternoon would probably return to a clutch of fried eggs.

But how does the incubating adult manage to cool its eggs? When the core body temperature of nonbreeding mourning doves has been measured on very hot days, through the indelicate but effective means of slipping a temperature probe up the cloaca of captive specimens held in the hand, researchers have recorded values ranging from 107 to 111 degrees. If incubating doves had internal temperatures equally high, their brood patches would be very warm, and their eggs would hardly be cooled at all even with air temperatures of 113 degrees.

Walsberg and Voss-Roberts wanted to check the core temperatures of a sample of *incubating* mourning

JEFF FOOTT (2)

I am now inclined to put the males of our Arizona mourning doves in a category of super-incubators even one step above emperor penguins

An adult mourning dove sits with a nestling at its nest (right); proof positive the birds can successfully rear young in the searing heat.

doves. To do so they first had to find nests within stepladder range. Then they acclimated the chosen pair to a stepladder by putting one in place in the early morning and then hurrying away. Later, in the heat of the afternoon, they returned to ascend within striking distance of the incubating bird, which they found gratifyingly reluctant to flush from its nest. They were able to pick some individuals up right off their clutches; others were trapped in a handheld hoop of mist netting. The researchers slipped a plastic-coated thermocouple up each dove's cloaca to measure the bird's internal temperature and quickly released it to regain its dignity and composure elsewhere. They then departed promptly so the bird could return to its eggs as soon as possible.

Walsberg and Voss-Roberts thrilled to see the measurements they secured from the unwilling participants in their research project. It turns out that on heat-baked afternoons, incubating doves have much lower temperatures than non-breeding birds. The incubating birds manage to depress their body temperatures to around 100 degrees Fahrenheit—cool enough to keep eggs from overheating on the hottest days.

The doves achieve these lower-than-normal internal temperatures through evaporative cooling, a technique appropriate for Arizona during the months when humidity is low and evaporation rates are correspondingly high. The birds pant and engage in gular fluttering, vibrating their throat muscles to move more air over the moist tissues of the throat and mouth. As the moisture evaporates, it cools the throat region and the blood circulating through the area and eventually lowers the temperature of the blood passing near the surface of the brood patch, converting it from a heater to a cooler (relatively speaking).

The plus side of a high rate of evaporation is a high cooling effect. The down side is a high rate of water loss—a serious matter for an incubating dove on a June afternoon in Randolph Canyon. Mourning doves in Arizona and elsewhere follow an incubation schedule that requires the males to take over around 9:00 A.M. to 10:00 A.M. and stay put until about 4:00 P.M. to 5:00 P.M.—six to eight hours of nonstop incubation during the most parching period of a summer day. An incubating male loses water continuously in an attempt to keep cool enough to provide a survivable environment for his unborn offspring.

Having experienced on a few occasions the profoundly unpleasant stress of an empty canteen coupled with a long walk back to the trailhead on a hot desert day, I am now inclined to put the males of our Arizona mourning doves in a category of super-incubators even one step above emperor penguins. The penguins are so magnificently insulated against the cold that they hardly have to change their internal heat production at all to keep their eggs warm. But a male mourning dove must perform elaborate physiological maneuvers to lower his body temperature enough to be an effective egg cooler on a really hot day. The incubating male walks a tightrope as he works to keep the eggs from reaching lethally high temperatures while at the same time not losing his own life through dehydration.

I wouldn't have guessed the extent of a mourning dove's capacity for sacrifice just by looking at the bird, which has none of the mystique of the emperor penguin. It is good to have avian "heroes" in my own neighborhood, birds that I can appreciate and admire for their coolness under fire. ☐

John Alcock is a professor of zoology at Arizona State University and a long-time enthusiast of Sonoran biology. He has written about desert animals in his book, *Sonoran Desert Summer* (Tempe: University of Arizona Press, 1990).

BHL

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MARK J. RAUZON (2)

SAVE OUR SHEARWATERS!

Mark J. Rauzon

When shearwaters crash into city lights,
Kauai islanders fly to the rescue

On the Hawaiian island of Kauai, autumn is marked not by colorful leaves whirling through the air but by birds falling from the sky. Fluttering like moths to a flame, fledglings on their maiden flight to the sea are disoriented by city lights. Each October and November, hundreds crash. Those that survive the collision with a lamppost and the fall to the ground face the hazards of civilization — cats, dogs, and traffic.

The falling birds are Newell's shearwaters. Medium-sized seabirds, black above and white below, shearwaters take their name from their characteristic flight pattern. They bank high, then glide just above the sea, appearing to slice the water with their wing tips.

City lights are a 20th century threat; the Newell's shearwater faced others in the previous century. Indeed, 60 years ago the species was believed to be nearly extinct, and currently it is classified as a threatened species by the U. S. Fish and Wildlife Service (USFWS) and the State of Hawaii.

Shearwaters once were common in lowland areas of the Hawaiian islands, as evidenced by their abundant remains in middens, or prehistoric trash heaps. Native Hawaiians relished the birds and would insert pointed sticks into the underground nests to retrieve shearwater chicks. The birds were fried in their fat.

The Polynesians, who arrived in the Hawaiian islands around 800 A.D., brought more trouble for shearwaters. They cleared the land for agriculture, hunted, and let their bird-eating dogs and pigs roam free. In the thousand years before Captain Cook landed in Hawaii in 1778, Polynesians may have caused the extinction of as many as 39 bird species. The European settlers introduced the mongoose and cats to some of the Hawaiian Islands. Unfortunately, these predators ate not only vermin but nesting birds, and most of the remaining colonies of shearwaters disappeared.

The Newell's shearwater nearly escaped the attention of contemporary scientists. It was not until 1894 that this shearwater was scientifically described by Brother Mattias Newell of the Society of Mary. No other ornithologist recorded sighting Newell's shearwaters until after 1908. In 1931, the Territory of Hawaii placed the Newell's shearwater on the long list of extinct Hawaiian birds. (Today 23 of the 72 native Hawaiian species still extant when Captain Cook arrived are extinct, and 30 more are endangered.)

Then, on an autumn night in 1954, a female Newell's shearwater crashed into the spotlight of modern science. A disoriented shearwater flew into the lights of a party on the island of Oahu. An alert party-goer recognized the bird as something unusual and saved it for identification.

Biologists who examined the specimen were astounded to rediscover Newell's shearwater. They were particularly surprised that the discovery had been made on Oahu, which hosts the Indian mongoose, a rapacious bird predator. They looked to another island, Kauai, as the most likely location of the shearwater's breeding grounds, for almost miraculously, Kauai had been spared the introduction of the mongoose.

The search for the nesting grounds was on — and it lasted for almost 15 years. In 1967, USFWS biologist John L. Sincock got a hot lead. Some Kauai pig hunters' dogs returned from the field with black-and-white feathers in their mouths. Sincock followed up on a hunch and Newell's shearwaters were rediscovered, nesting on a knife-edged mountain ridge carpeted in dense ferns. To get to the nests, Sincock had to jump from a hovering helicopter.

Each autumn on the Hawaiian island of Kauai, county fire stations (above) serve as "aid stations" for grounded Newell's shearwaters (left). State wildlife officials transport the birds to release sites for a safe launch to the sea.

Once Sincock had located the shearwaters' remote mountain retreat, he studied the birds and systematically described their breeding habits. Each April, individuals return from the eastern tropical Pacific to renovate or dig new burrows in dense *uluhe* fern thickets. After six months spent silent and alone at sea, shearwaters vocalize enthusiastically above the colony at night. The balmy night is rent by caterwauling that sounds like crying babies, ghoulish laughter, and braying mules.

The female shearwater lays a single white egg that both parents incubate for 45 days. They feed the chick a diet of regurgitated ocean-caught squid and fish. As the chick matures, the parents visit the burrow less and less frequently until their visits cease altogether. The abandoned chick weighs more than its parents. Slowly it uses up its fat reserves and sheds its last vestiges of down.

One autumn night the fledgling shearwater climbs up a tree trunk or rock ledge above the entangling vegetation and launches itself into the darkness. From its mountain birthplace, the fledgling follows river valleys to the coast. This maiden flight is the most dangerous hour of its life. The young bird flies toward

the starry horizon. For millennia this strategy guaranteed safe passage over the lowland vegetation.

Today, however, electrical "constellations" dominate the night sky. Rapid coastal development has transformed the Kauai skyline. Until the 1960s Kauai consisted of small sugar plantation communities. But as tourists discovered the "Garden Isle," resorts were built and with them came security lighting.

Fledgling shearwaters are phototropic — attracted to light. But when they reach the resort lights the fledglings seem to be blinded and disoriented by the brightness. They circle the lights silently, passing into and out of view. Suddenly a bird careens into a powerline or a wall, or falls exhausted from the sky.

Rainy nights or dark nights with low cloud cover are especially perilous for shearwaters. Many fly into car headlights along stretches of highway near the mouths of river valleys. Those that survive the impact are unable to take off again. Shearwaters' legs are designed for running on water. On the ground, in confined spaces, the birds can't get up speed to fly. So each fall hundreds of shearwaters end up on the streets, in backyards, and in resort areas. Those that escape the cats and dogs often succumb to starvation and dehydration.

Kauai islanders to the rescue. "Save Our Shearwaters!" has become the rallying cry for the residents who recover downed birds. A rescue effort was launched in 1978 by the Hawaii Department of Land and Natural Resources and USFWS. Now each autumn newspaper reports and radio broadcasts alert listeners to the annual shearwater recovery program. Rescuers are instructed to drop off downed birds at "aid stations," usually Kauai County fire stations. State and federal wildlife officials pick up the birds at the aid stations and examine them for injuries. Less than 10 percent of the downed birds die. A few of the injured birds suffer neurological damage and must be euthanized. Healthy birds are banded and weighed before they are released from launch sites near Lihue and Kilauea Point National Wildlife Refuge. Occasionally a newly banded bird will be recovered again in the same season — a truly disoriented creature!

Each year about 1,500 fledglings are recovered and released; since the program began in 1978 over 20,000 shearwaters have been rescued. Surprisingly, the number of young birds recovered has remained fairly stable over the years in spite of accelerated shoreline development and the effectiveness of the recovery program. Scientists estimate the breeding population of Newell's shearwaters at around 8,000 adults; since a significant number of nonbreeding birds live at sea, the total population is probably around 10,000 birds.

Juveniles who reach the sea spend two or three years away from land and probably suffer high mortality. Of the thousands of fledgling shearwaters banded in the last 12 years, only eight have been recaptured. Adults are rarely found in the fallout because they are more experienced fliers and appear to be less sensitive to lights. But adults occasionally fly into utility wires as they exit mountain valleys.

Besides the well-orchestrated effort to rescue downed birds, "Save our Shearwaters" has experimented with protecting birds on the wing by reducing the light from street lamps and security lights. In 1980 and '81 USFWS contracted Jonathan Reed, a gradu-

THOMAS TELFER (3)

Newell's shearwaters nest in colonies on Kauai (above). Each female lays a single egg in her underground nest; both parents feed regurgitated squid and fish to the downy chick (right) until it is fatter than they are. These fledglings (above left) will soon make their treacherous first journey to the sea.

The birds nest on a knife-edged mountain ridge carpeted in ferns

BHL

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MARK J. RAUZON (2)

Rescued shearwaters are weighed, measured, and banded (below right) before being released (above) near Lihue and Kilauea Point National Wildlife Refuge. Juveniles will spend two to three years at sea before returning to their breeding grounds.

ate student from the University of Wisconsin, to investigate the effects of installing light shields on bright floodlights at a resort hotel. Shearwater fallout in the study area was reduced by nearly 40 percent.

In 1983, The Nature Conservancy of Hawaii spearheaded a fund-raising drive to purchase special hoods that could be fitted on streetlights to direct the beams downward. Kauai Electric Company installed the shades in areas with heavy shearwater fallout. Unlike Reed's pilot study, unfortunately, "Operation Shades" does not seem to have saved many birds. The streetlights are so numerous that their glow attracts birds even with the light shields in place.

The multitude of lights in truly urban areas can never be completely controlled. During the peak fledgling period, and during the new moon, when fallout is heaviest, Kauai resorts are asked to extinguish their nonessential lighting to help reduce shearwater fallout.

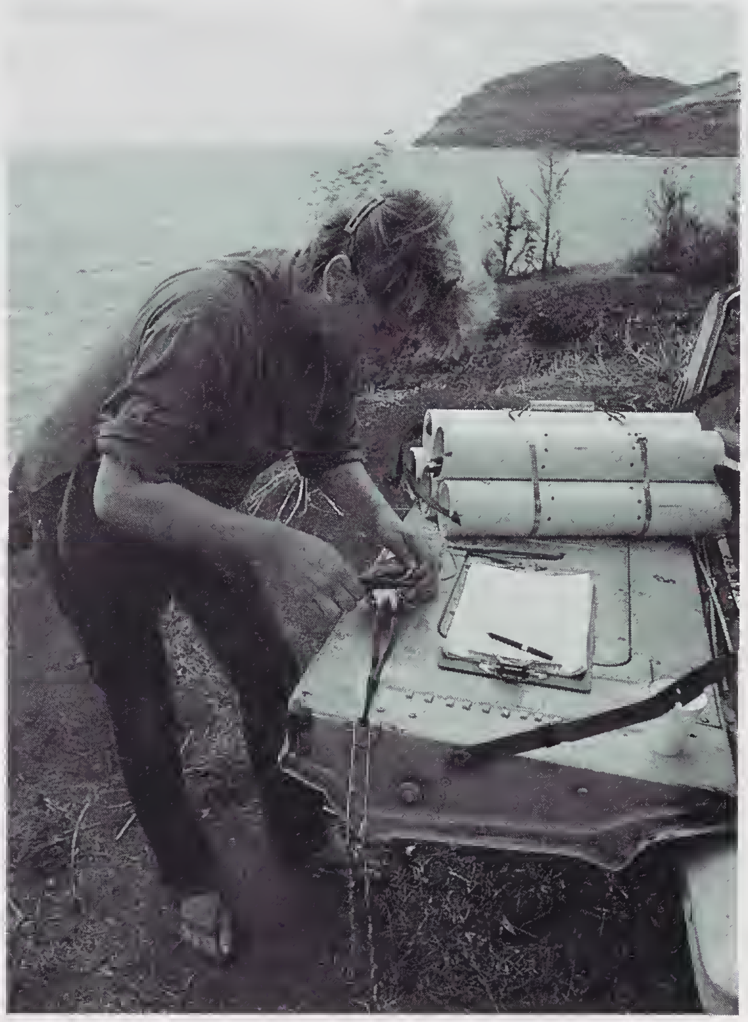
Another goal of the shearwater recovery program is to identify and manage breeding areas to reduce predation and human impact. Scientists consider the numerous colonies in remote, nearly inaccessible mountains to be relatively safe. But colonies near population centers require management. The Nature Conservancy of Hawaii, for example, currently protects the Kaluahonu Preserve, 218 acres that have been leased from Grove Farm Company, a Kauai-based sugar plantation. One shearwater management strategy at Kaluahonu is fire prevention. The preserve's tinder-dry ferns are perilously close to sugar cane fields that may be deliberately burned to remove the leaves from the cane before harvest. Marijuana growers who trespass in the preserve also increase the risk of fire. They introduce exotic vegetation and cut trails that predatory animals such as pigs and cats may follow. Volunteer managers maintain a close watch.

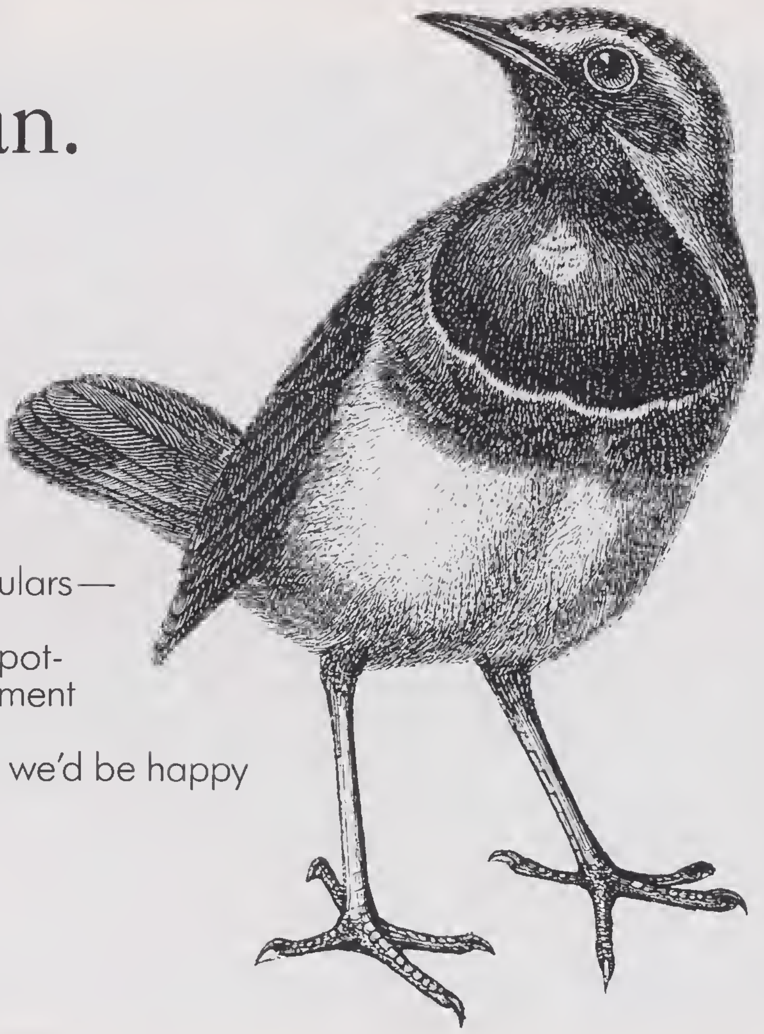
The voracious mongoose, though not yet established on Kauai, is a potential threat. Its arrival on boats or in air cargo coming from the other Hawaiian Islands is a very real possibility. Several unconfirmed sightings of mongooses on Kauai spurred the shearwater's guardian biologists into action. Vernon Byrd, John Sincock, and Tom Telfer experimented with cross-fostering, placing Newell's shearwater eggs in the nests of wedge-tailed shearwaters at Kilauea Point National Wildlife Refuge. They hoped to establish a predator-free colony of nesting Newell's on an offshore islet where predators could be controlled.

The northernmost point of the main Hawaiian Islands, the refuge is also the premier showcase for Hawaiian seabirds. Here, fences keep cats and dogs at bay. In this sanctuary and on Mokuaeae Islet, foster wedge-tailed shearwater parents raised 90 Newell's shearwater chicks during a three-year period. About 94 percent of the young fledged successfully and now, several years later, some are returning. The scientists have heard adult Newell's shearwaters calling above their foster home. None of these birds have yet bred, however. The researchers suspect that to initiate breeding there, the cross-fostered birds may need to hear other Newell's shearwaters calling from burrows on the ground.

As coastal development continues on Kauai and more lights are installed, Newell's shearwaters will need even more help to survive. Only through the continued recovery efforts of concerned Kauai citizens can the future of the Newell's shearwater be guaranteed. ☐

Mark J. Rauzon is a biogeographer who studies, among other things, the effects of cats on island birds. He is also a writer and photographer. His children's book, *Jungles* (Doubleday) will be released in October 1991.





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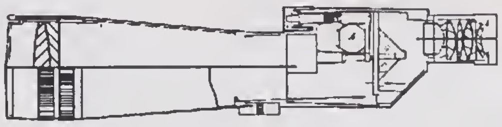

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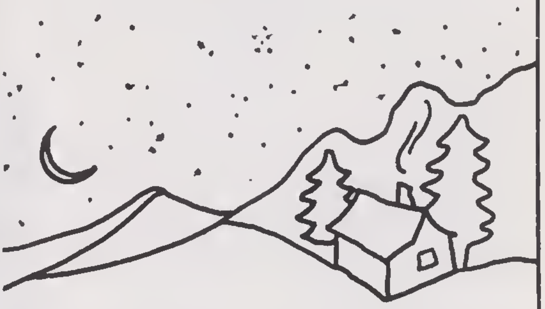

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HYACINTH MACAW

David Wilcove

With so much attention focused on the drug epidemic sweeping our country, I sometimes find myself thinking about hyacinth macaws. It's not as absurd a comparison as you might think. Both products are smuggled out of South America in violation of numerous laws, and both fetch handsome prices in the United States and Europe. Early last summer, for example, cocaine was selling for about $20,000 per kilogram. Hyacinth macaws, officially protected but very much in demand as pets, were selling for as much as $10,000 each, or roughly $6,700 per kilogram.

A glance at a bird-book illustration of a hyacinth macaw quickly reveals why the bird is so coveted by cage-bird fanciers. It is the world's largest parrot, measuring a yard or more in length from bill to tail. But the hyacinth macaw's color—an iridescent, deep cobalt-blue—is what really makes it stand out. Garish patches of bright yellow skin at the base of the bill and around the eyes add a somewhat clownlike look.

The hyacinth macaw's feeding habits are as exceptional as its appearance. It is the world's most specialized parrot, feeding almost exclusively on the meaty pulp of palm nuts, which it shears open with the dexterity and nonchalance of a Benihana chef. At one time, hyacinth macaws probably occurred in every Amazonian and central Brazilian dry forest with enough palms to provide an adequate food supply and enough natural cavities to furnish nesting sites. But an expanding human presence in Brazil, Bolivia, and Paraguay has extirpated the bird in many parts of its range. In places where explorers of a century ago reported seeing hundreds of hyacinth macaws, today there are none. The species is now restricted to three small populations in regions where pressure from bird trappers, hunters, and developers is less intense. One population is centered in the Brazilian state of Pará in the eastern Amazon, another is located in northeastern Brazil, and the third occurs in the Pantanal—a vast, seasonally flooded marshland that straddles the borders of Brazil, Bolivia, and Paraguay.

The trapping of macaws for the exotic bird trade is particularly threatening for these isolated populations because the species as a whole has a very low reproductive rate. Only a small percentage of adults breed in any given year, and successful pairs will fledge only a single youngster. A population of 100 mated pairs of macaws may produce only 7 to 25 young a year. Thus even a small amount of trapping or hunting can deplete an entire population. Although accurate census data are difficult to obtain, the total number of hyacinth macaws remaining in the wild has been estimated at between 2,500 and 5,000 — enough birds to give us a fighting chance to save the species, few enough to make extinction a real possibility.

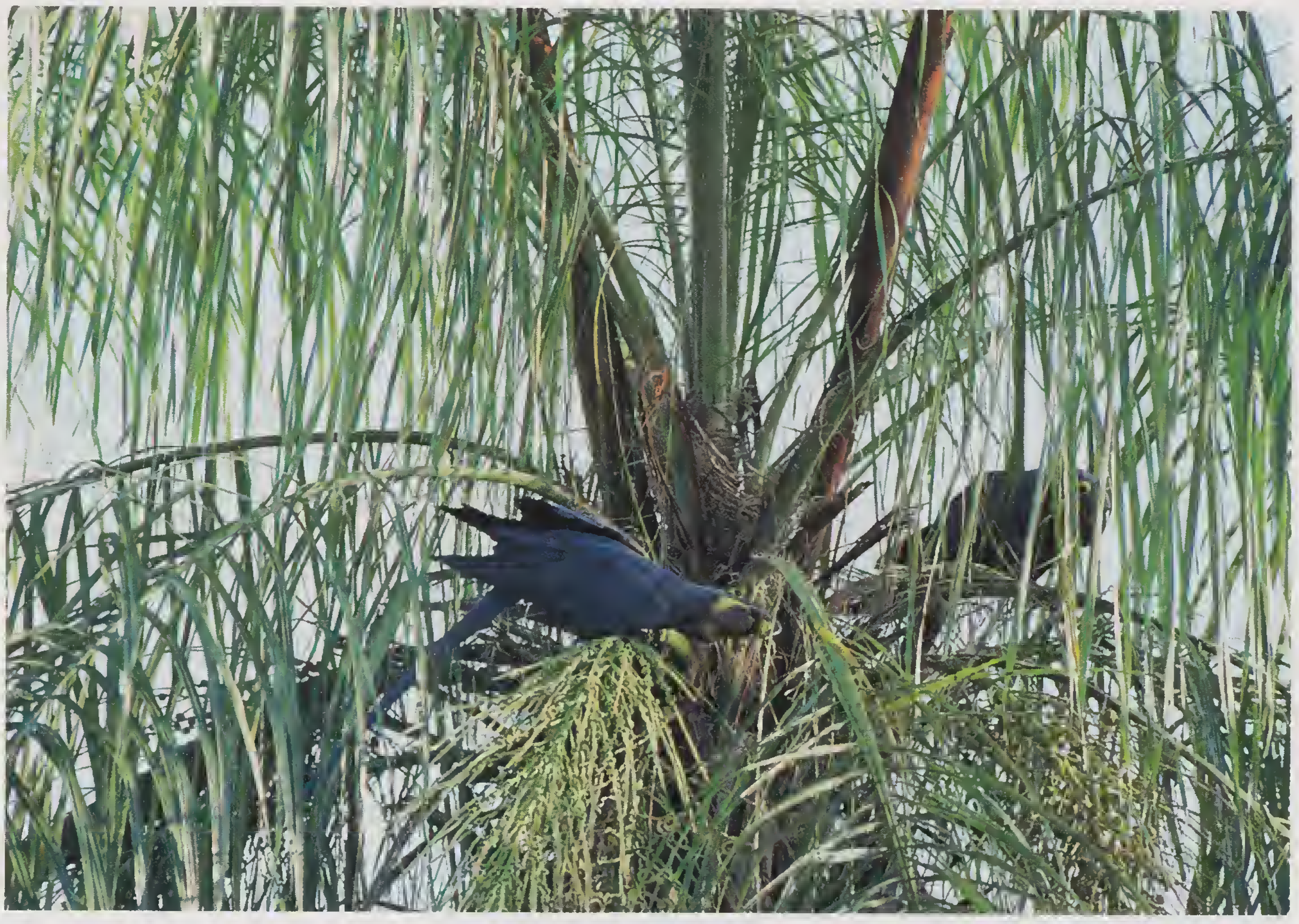
Trapping is the major threat to the hyacinth macaw, but not the only one: each of the three populations faces different challenges. In Parà, for example, trapping isn't a major problem, in part because the Indians living there aggressively defend their land (and macaws) from outsiders. Far more serious is the eventual spread to the region of cattle ranching, an unsustainable enterprise in which rich forests are turned into barren pasture. In northeastern Brazil, on the other hand, animal protein is in short supply, and macaws are frequently shot for food. And in the Pantanal, ranchers leave palm trees standing because cattle will munch the palm nuts that fall from the trees, but they cut down all other large trees, including the only two species that grow large enough to provide nest cavities for the macaws.

Brazil, Bolivia, and Paraguay have long-standing laws

CHARLES A. MUNN

Spectacular in size and color, hyacinth macaws seem at home both in Brazilian barnyards and palm forests—but trapping and development threaten the birds.

prohibiting the capture or killing of hyacinth macaws, but enforcement is lax. They simply don't have the resources to deal with a problem of such magnitude. In the Pantanal, for example, Brazil's Forest Police has only about a dozen field agents to patrol over 50,000 square miles of wet and remote wildland.



CHARLES A. MUNN (VIREO)

In 1987, a worldwide ban on trade in wild-caught hyacinth macaws was imposed—an important step in combatting the cage-bird trade at the receiving end. Such new laws and better enforcement of existing laws will go a long way toward protecting hyacinth macaws, but they can be only a part of the solution. Until owning a wild-caught hyacinth macaw becomes as socially unacceptable as wearing a leopard-skin coat to a World Wildlife Fund banquet, there will always be people willing to pay vast sums of money to own one. They'll pay unscrupulous dealers who will pay unscrupulous middlemen who will pay poor Brazilian trappers. And the birds will disappear. In places where people are hungry, macaws will continue to be shot for food. Ultimately, the governments of Brazil, Bolivia, and Paraguay must find a way to give the people who live among hyacinth macaws an incentive to protect them.

In the Pantanal, that incentive could be tourism. The news is slowly spreading in Brazil, the United States, and Europe: the marshlands of the Pantanal provide the premier wildlife spectacle in South America. While the lush forests of the Amazon contain far more bird species, most are rather difficult to see—furtive antbirds skulking in the undergrowth, tanagers slipping through the forest canopy. In contrast, the open terrain of the Pantanal is ideal for observing wildlife.

Last August a friend and I visited the Pantanal to see if it could possibly live up to its reputation. It did. Thousands of egrets, herons, spoonbills, wood storks, and jabirus crowded the open pools of water, squawking and fighting as they gulped down incalculable numbers of fish. Capybaras—brown, hippo-shaped rodents that can weigh over 140 pounds—lined the edges of the larger ponds, seemingly oblivious to the hundreds of caimans basking nearby. It was a staggering aggregation of big, bizarre creatures, all living their lives in a frontier that has refused to be settled for almost four centuries.

And the hyacinth macaws? They were there too, appearing at unpredictable moments. Our first encounter with them came at the end of 10 hours of driving along the Transpantaneira, the dirt "highway" that cuts through the northeastern part of the Pantanal. We were tired, hot, and lost. Glancing out the window, we spotted an enormous, dark bird with a long tail perched atop a small tree. A look through my binocular confirmed what my racing pulse was already telling me—here, at last, was a wild hyacinth macaw.

We tumbled out of the car and fussed with our cameras and spotting scopes. There were three macaws. They climbed up and down the fronds of a palm tree, plucking the hard green fruits and cracking them open with their massive black bills.

As I gawked at the birds through the scope, my thoughts wandered back in time. I was seven years old, pressing my face against the glass of a small cage at the Buffalo Zoo. Inside, an enormous purple parrot—a hyacinth macaw—stared back with that clever, sardonic look that only parrots can give.

When I looked through the scope again, the palm tree was empty. It was 25 years later, the macaws had vanished, and I was standing on a dirt road in the middle of Brazil.

"They'll be back," I thought. But I couldn't be sure. □

David Wilcove is senior ecologist at The Wilderness Society. He serves on the boards of directors of the U.S. and Pan-American sections of the International Council for Bird Preservation.

Further Reading

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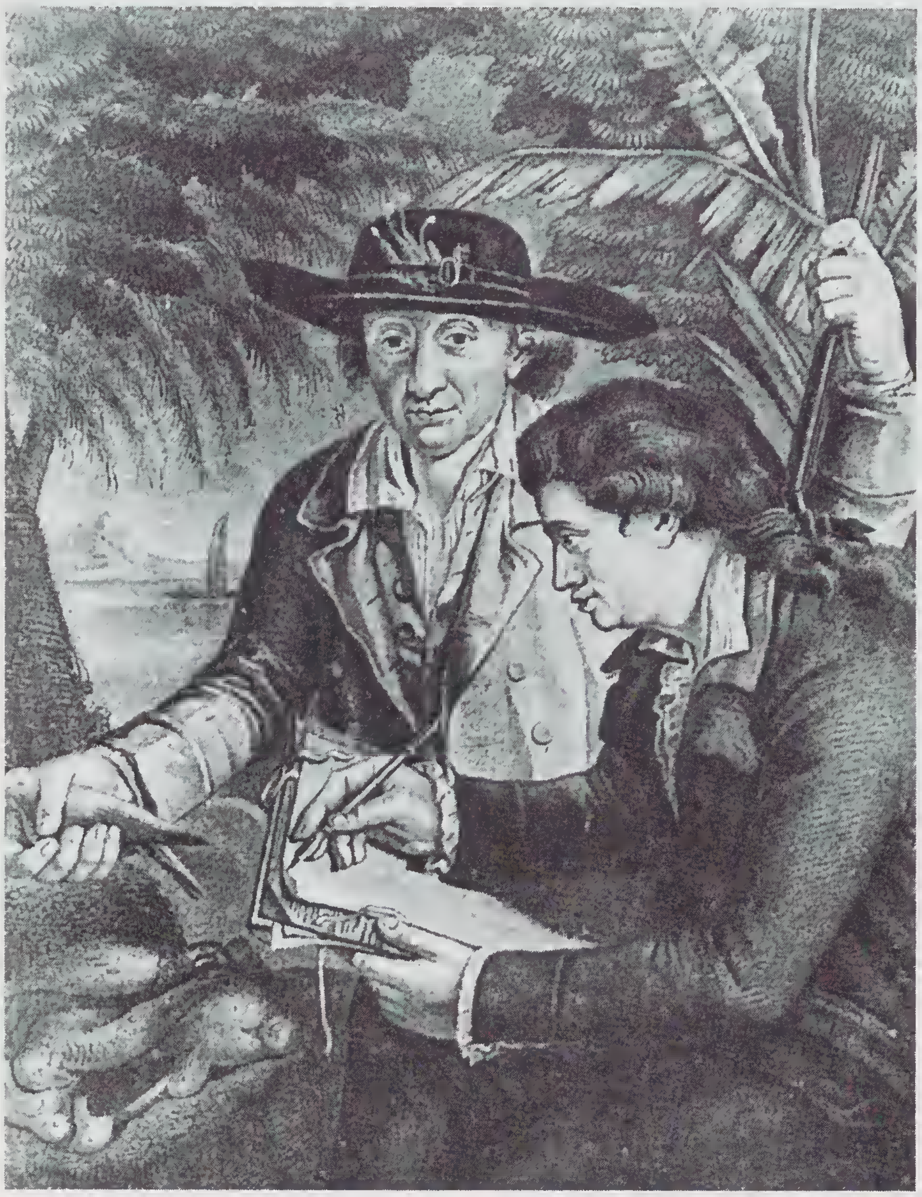


Naturalist Johann Reinhold Forster recognized an uncommon tern.

***Biographies for Bird Watchers: The Lives of Those Commemorated in Western Palearctic Bird Names* by Barbara and Richard Mearns. (London: Academic Press, 1988.) 490 pages. $35 (cloth).**

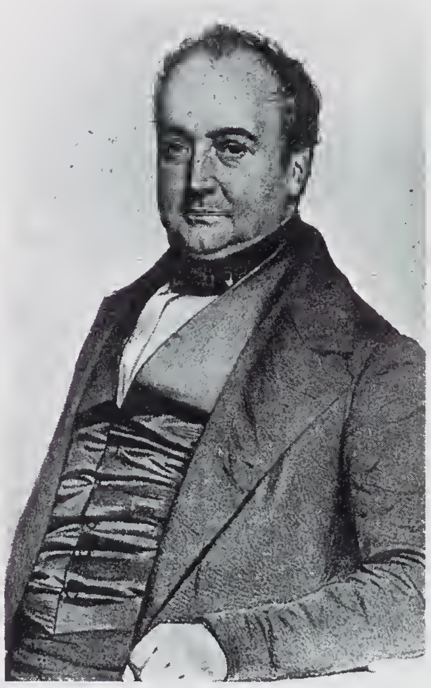
Have you ever wondered, as you watched a Bonaparte's gull or Forster's tern, who Bonaparte and Forster were? What did they do to get someone to name a bird species after them? Was Bonaparte *the* Bonaparte, or perhaps some relative?

It turns out that the Bonaparte of gull fame was a nephew, Charles Lucien Bonaparte, who, among other things, wrote a four-volume supplement to Wilson's *American Ornithology*. And Johann Reinhold Forster was a naturalist of Scottish descent who accompanied Captain Cook for three years on Cook's second Pacific voyage. Although Forster never visited North America, he apparently recognized differences between specimens identified as common terns—differences that Thomas Nuttall later thought were significant enough to justify naming a new species for the eminent naturalist and voyager.

Bonaparte and Forster are just two of the 91 eponyms presented in this well-written, well-documented book. Appendices give shorter biographical sketches of two dozen naturalists commemorated either by bird species of uncertain status or by bird subspecies, as well as very brief sketches of more than 70 naturalists mentioned in the main text. The introductory chapter on scientific nomenclature and the extensive bibliography should be very helpful to anyone wishing to delve further into the fascinating ornithological history presented in this volume.

Because explorers and naturalists sent the specimens they collected on the frontiers of the world back to Europe to be described and named, this book includes people from a broad geographic spectrum. The majority of the subjects lived in the 19th century, the period of exploration when most of the world's bird species were described. The sketches do include Aristotle, however, and several living naturalists. The lives of many of these adventurers make fascinating reading; hardship and privation were the rule, and an early death was not uncommon.

Biographies for Bird Watchers is a handsome book, with nearly a hundred portraits and maps and more than a hundred delightful black-and-white drawings by Darren Rees. The only problem for an American reader is the focus on European birds and people. Only about a fifth of the birds included in the book are found in North America, and there are only five Americans among those featured in biographies. Nevertheless, if you like biography, history, or tales of adventure, this book is worth the price.



Napoleon's nephew—a gull's eponym.

—*William E. Davis, Jr.*

"THE GREBE" SCOPE/TRIPOD BAG

The designers of the Grebe scope/tripod bag had the first spark of an idea for their product during a birding trip to Point Pelee, Ontario. Looking at the other birders that day, they noticed many of them carried their expensive scopes and tripods in plastic garbage bags while walking the trails. The reason? So they could keep their scopes attached to their tripods—ready to set up and look through in a moment if an interesting bird showed up. Birders who wanted to tote their gear in nice cases had to pack scope and tripod separately, taking them out and assembling them when the need arose. So the Grebe designers created a single long shoulder bag with an enlarged top end that could accommodate a tripod with a spotting scope attached.

What I like best about the Grebe bag is its convenience. It provides a way to keep my vital equipment organized and

TIM GALLAGHER

ready to go. Besides my scope and tripod, which I always keep stored in the bag, I also cram in a few non-essentials to make my birding a little more pleasant—a sweatshirt, a wool cap, some snacks. Then I can grab my binoculars and my Grebe as I walk out the door and have all my basic birding needs in hand. While I'm traveling, the bag fits easily behind the bench seat in my pickup truck where I can get to it in a hurry.

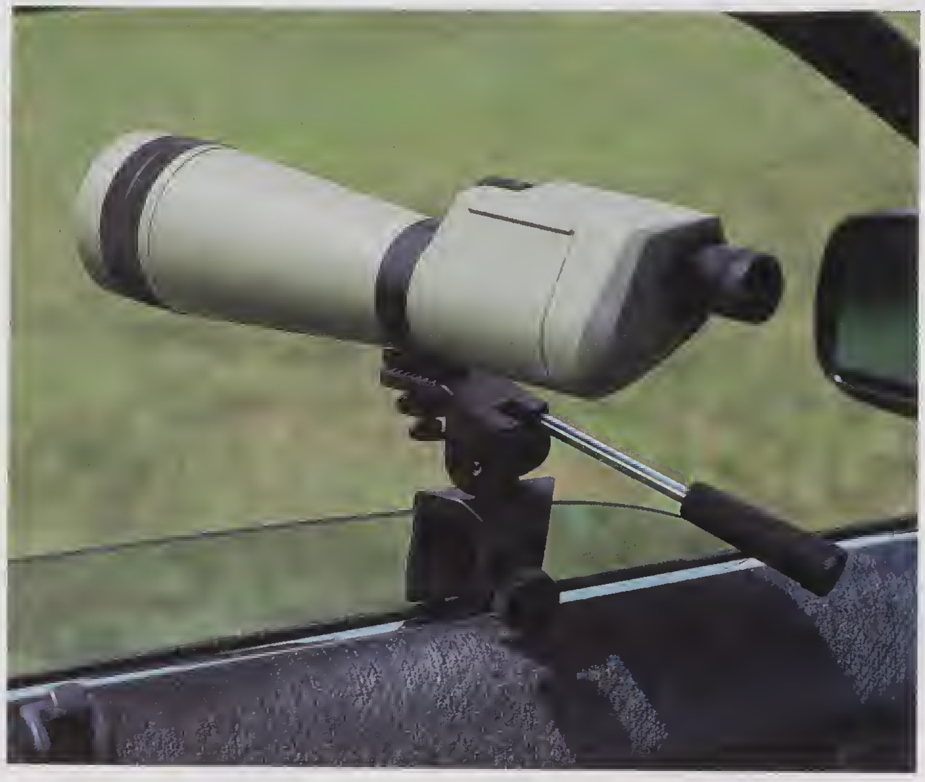
When I get to the field I sling the Grebe bag over my shoulder and carry it around with me until I get to a spot where I want to scan with my scope. It's then quick and easy to take the equipment out of the bag, extend the tripod legs, and look through the scope.

The Grebe bag is made of tough Cordura nylon and offers protection for your valuable equipment. Though it is not absolutely waterproof, it is highly water resistant and will keep your equipment dry in light to moderate rain. A flap over the zipper provides further protection from the elements. The strap is adjustable and has a wide flange at the top to distribute weight more evenly on the shoulder. Even so, the Grebe can be uncomfortable to carry for long periods. Since I don't have much natural padding the tripod really digs into my back at times. I solved the problem somewhat by putting a sweatshirt inside the bag between the tripod and my back.

The Grebe comes in smoke gray and is available in two sizes. The small bag (31″ X 8″) costs $25 in U.S. funds and will hold most scope/tripod combinations, but to be safe you should measure your equipment before ordering. The large bag (38″ × 8″) is slightly more expensive at $28. For more information, contact: Tenth House Gear, R.R. 1, Golden Lake, Ontario, Canada K0J 1X0.

—Tim Gallagher

BUSHNELL WINDOW MOUNT



The Bushnell Window Mount is a handy gadget for keeping your spotting scope steady on a highway birding trip. It allows you to turn your car into an instant 2,000-pound tripod. You just roll your window partway down, put the mount in place, then tighten the screw snug against the glass. Since I got one of these, I keep my scope attached to the mount at all times when I travel so it's always ready to set in place on my window and look through. This setup was very effective for quickly identifying prairie raptors I spotted from the road during a trip I took through western Canada.

Though the Bushnell Window Mount does make a solid attachment between your scope and your car door, the steadiness of the setup depends a lot on the car. I tried the mount on a friend's Cadillac and the scope was almost as firm as it would be if it were bolted to a tree stump. But when I tried it on a small foreign car, the car shook every time I fidgeted or moved my position to look at a different area through the scope. I had to keep as motionless as a statue to maintain a clear, steady image. This was no fault of the window mount, but it is a possible drawback you should consider before buying one.

I also tried out the window mount as a support for a camera and telephoto lens. It was entirely adequate for the purpose, but I still prefer using a simple beanbag to support my camera when taking pictures from a car. It's really a matter of personal choice based on your particular needs. A window mount will hold your camera more firmly than a beanbag. The extra setup time is what causes a problem for me. Most of the roadside photography I do is of the quick, hit-and-run variety. When I'm driving up to a bird that's perched next to the road, I turn my ignition off, roll my window down, and coast to an easy stop near the bird. I usually only have time to set the beanbag and camera on the windowsill and snap one or two pictures before the bird flies off. If I had to put the mount in place and adjust it before taking a picture, the extra seconds spent might cause me to miss the shot. When you use a spotting scope, however, spooking birds is much less of a problem because they are usually farther away.

A window mount is no substitute for a tripod—a tripod is a must when using a scope in the field—but it is certainly a great thing to have when visiting a "drive-through" sanctuary or when birding along the highway. The suggested retail price of the Bushnell Window Mount is $55.95.

—Tim Gallagher

KEEPING THE FAITH

Pete Dunne

I believe in birding. I honor the wing bar and tail spot. I worship the cold fronts of autumn and the blue northers of spring. I attend migrant traps regularly and try never to miss a feast day, when birds fall from the heavens like manna. At my bedside, always within reach in times of need, is my Peterson.

There are certain fundamental truths that anchor my faith. Hear them:

I believe that the sun will come up in the east on the mornings I go birding. (On other mornings I can't swear to it, and I don't really care!)

I believe that if I go to Cape May, New Jersey, on October 4, I will see a peregrine falcon.

I believe that when I peer through a pair of binoculars the world will get bigger. (If it doesn't, then it means I've forgotten to take the lens caps off, I'm looking through the wrong end, or the binoculars have been dropped with terrible force.)

These are just a few of the basic tenets of my faith. But there are two more that are even greater than these—two truths that form the linchpins of birding. Know them:

First: Seeing a new bird causes great joy.

Second: If it looks like a goose, flies like a goose, and honks like a goose, it is a goose.

I'll bet you think, as I once did, that these beliefs are pretty unassailable, right? Bet you think such self-evident truths make safe moorings for the worship of birds.

Well, you're wrong! Both so-called truths have been tested and found wanting.

The first assault on these prima facie principles of birding occurred on the hawk watch platform at Cape May. It was November, and the sun was just coming up (in the east!). A western kingbird (a first-generation specialty) landed near the platform just as a gentleman started climbing the stairs. He was well disguised as a birder, wearing binoculars and a 60/40 cloth jacket and carrying a field guide.

"Want to see a western kingbird?" I hailed.

The look of absolute joy that swept across that gentleman's face . . . why, it was enough to restore lost faith. He *ran* to the spotting scope, and if the expression he wore before he peered through the eyepiece could be described as radiant, what happened next when he saw the bird was nothing short of a nova. Then, suddenly, his face imploded, collapsing into a black hole of despair.

"What's the matter?" I asked. "You don't think it's a western kingbird?"

"Oh, no," he said. "It's not that. It's just that now I can't count it, can I?"

"What?" I tried to say, but the word strangled in my throat. He got the idea anyway.

"I mean, I didn't find it so now I can't count it," he said. "Isn't that how it works?"

Actually, I don't know how "it" works, or doesn't work. All I know is that a situation that should have been a cause for celebration became instead a source of abject despair.

Perhaps the greatest challenge birding has ever known occurred at Higbee Beach. This time it was David Sibley whose faith was tested and momentarily bested. David and I were co-leading a field trip. He looked up, saw a flock of snow geese, and called them out to the group.

"Where?" asked a woman whose manner throughout the tour had been more than a little disagreeable.

"On the left side of that big white cloud shaped like the state of Ohio. They . . . ."

"I see them," the woman snapped. "But how can you tell they're snow geese?"

"Well," David explained in his usual, infinitely patient manner, "they're large, they have long necks, they're all white except for black wing tips, and they're flying in a vee."

"I can see all that," this demon disguised as a birder snapped sardonically. "But, David," she demanded, "what I want to know is *how can you tell they're snow geese?*"

David opened his mouth, maybe to say something, maybe to take a deep breath to assure himself that, at the very least, there was still breathable air on the planet. Then he turned and walked away, mortally wounded by the metaphysical missile that had blown a hole clean through his soul. What else could he do?

What can anyone do when confronted by a man who will see a new bird and not know joy, or a woman who rejects the very principles of field identification? Little. Perhaps nothing. Just have faith. And maybe get up the next morning, go birding . . . and check to see whether the sun comes up in the east. □

TOM MANGELSEN

A prima facie principle of birding: If it looks like a goose, flies like a goose, and honks like a goose, it is a goose.

WILLOW PTARMIGAN CHICK BY HENRY H. HOLDSWORTH

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BIRDSCOPE

The research newsletter of the Cornell Laboratory of Ornithology • Volume 5, Number 2 • Spring 1991

A Webster's for Woodcreepers

Nathaniel Comfort

Researchers lay the foundation for a dictionary of birdsong

You might be disappointed when you finally see a tropical rainforest. Hopes of seeing brilliant birds dripping from every branch are quickly shattered in the verdant tangle. Yet, although you can't see them, you know they are there—you can hear them. Experienced tropical scientists and birders know to trust their ears more than their eyes. Often a bird may be just a few feet away, yet invisible. The only way to identify it is by call. Alas, the number of species and the lack of a comprehensive field guide to their songs makes identifying and censusing neotropical birds a task for an ornithological Sisyphus.

Recent work in the Lab's Bioacoustics Research Program and the Library of Natural Sounds (LNS) is chipping away at this problem by laying the foundation for a "dictionary of birdsong." A computerized collection of sounds will make censusing birds by sound easier and more accurate and will aid neotropical conservation efforts. The groundwork for the dictionary is being done by Curtis Marantz, a graduate student at the Museum of Natural Sciences at Louisiana State University. He is working with Bioacoustics director Dr. Christopher W. Clark and LNS director Greg Budney to develop a new way to study variation in song between closely related species.

Between August and December of last year, Curtis used the LNS and Bioacoustics facilities at the Lab to analyze and classify the songs of woodcreepers—Central and South American suboscine passeriforms related to ovenbirds and antbirds. Woodcreepers have simple, stereotyped songs consisting of only a handful of note types, and the songs are innate, not learned. Compared to the repertoires of some songbirds, woodcreeper songs are monotonous indeed.

Dendrocolaptes concolor by Curtis Marantz

Woodcreepers are bark-foraging suboscines related to ovenbirds.

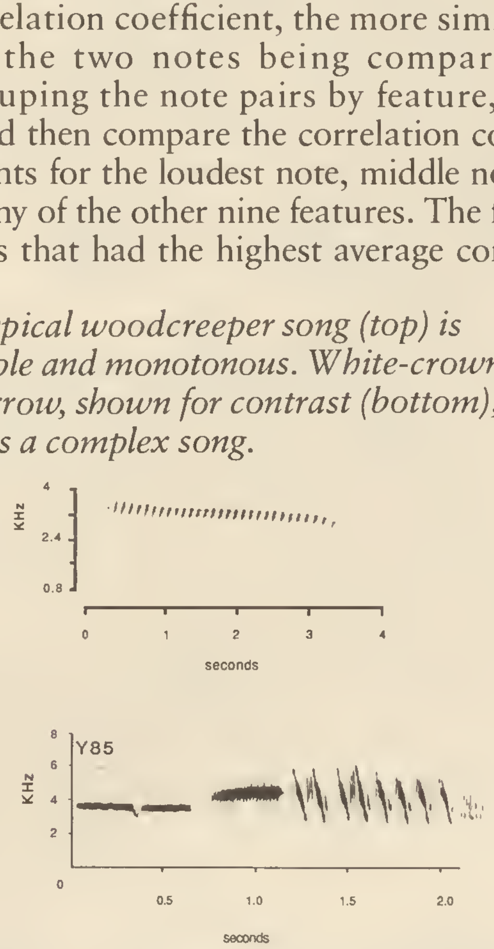
A single species of sparrow has as much variation in its song as all 45 species of woodcreepers combined, says Chris Clark. The simplicity of their songs is what attracted Curtis to woodcreepers. The song of a sparrow is too complex for his experimental analysis—it would be like trying to learn auto mechanics on a turbo Maserati as opposed to a vintage Dodge Dart.

Curtis's work at the Lab began in LNS where thousands of neotropical bird songs are archived. Curtis pored over reels of tapes, compiling nearly six hours of woodcreeper songs, and selected one genus, *Dendrocolaptes*, to focus on. Then, using specialized software developed by Bioacoustics, he began to sort and analyze the songs.

He hoped to find the "signature" of each species, that part of the song that is most consistent from song to song and from bird to bird. After making an audio spectrogram—a picture of the song represented as frequency versus time—Curtis noticed that the middle notes of the song seemed to be the least variable, while the first and last notes sometimes changed, perhaps because the bird saw a predator, or an intruder, or a potential mate. A subjective observation isn't science, however—Curtis needed an objective way of measuring the variability of the different components of woodcreeper song.

Curtis then converted the analog tape recordings into digital computer files and began an exhaustive analysis. He described nine features of each song: first note, last note, middle note, loudest note, note with the greatest range of frequencies, and so on. He then used these to compare the similarity between pairs of song notes. With an average of seven notes per song and five songs per bird, he had a set of about 35 notes per bird. Curtis compared each note with every other in the set, calculating a correlation coefficient for each pair of notes. The higher the correlation coefficient, the more similar are the two notes being compared. Grouping the note pairs by feature, he could then compare the correlation coefficients for the loudest note, middle note, or any of the other nine features. The features that had the highest average corre-

A typical woodcreeper song (top) is simple and monotonous. White-crowned sparrow, shown for contrast (bottom), sings a complex song.



Woodcreeper courtesy of Bioacoustics Research Program. LNS #23-723. Sparrow from D. Margoliash, J. Neurosci. 6(6):1643–1661 (1986).

lation, then, were the least variable features of that bird's song.

Curtis's hunch proved correct. His analysis showed that three features — the middle note, the loudest note, and the note in the middle part of the song with the largest frequency range — were the least variable features of *Dendrocolaptes* song. None of the other six features came close to these three in meeting the criteria for "signature" notes. Not surprisingly, these features often described the same note — the middle note was often the loudest, for example.

Why are the middle notes so stable? When they do change, how do they change? Curtis is ultimately interested in how bird songs evolve. As species evolve, their songs change — or is it the other way around? He plans to make an evolutionary tree of *Dendrocolaptes* song and compare it with a tree based on genetic differences between species. He doesn't yet know how his tree will compare with the genetic one, but he suspects that it will be a closer match than an evolutionary tree based on external body shape and plumage would give.

For example, Curtis found two populations of *D. certhia* on opposite sides of the Andes that look identical but have significant differences in their song. A geneticist might find that these are actually two "fledgling" species; *D. certhia* may be splitting into two separate species right before our eyes. Why not just do all the genetic analysis first? "It's a *lot* easier to do an acoustic analysis than a genetic one," Curtis says.

Besides being interesting to evolutionary biologists, Curtis's work is the first step in creating an extensive computerized song dictionary. Once the "Dodge Dart" woodcreepers are done, researchers can move on toward the "turbo Maserati" wrens and thrushes. Such a dictionary will help conservationists in preserving neotropical forests. Right now, the only comparable resource is a handful of ornithologists whose bird sound identification skills makes each of them a walking dictionary of neotropical birdsong; they can walk into the forest, listen to the birds, and, sight unseen, identify nearly all the species. The computer dictionary of birdsong will allow us to "clone" these people, enabling a mere mortal to bring a tape recorder into the forest, record the songs, bring the tape back to Sapsucker Woods, and let Lab of Ornithology computers identify the species. This will greatly assist the painstaking process of cataloging the avian fauna of specific forest areas — essential information for conservationists trying to preserve the neotropical forests. □

TIM GALLAGHER

Bob Kantor of Finger Lakes Productions, your host on BirdWatch

Broadcast News

The Lab's national radio show gets people hooked on birds

BirdWatch, the Lab's national radio show, is a showcase for the wonderful world of bird sounds. The program, launched in February, 1990, airs daily on over 60 radio stations across the country, inviting listeners into the world of birds from the backyard to the tropical rain forest and beyond. Over 260 shows hit the airwaves this past year, reaching an estimated two million listeners each week.

Popular appeal and national distribution are two things that make BirdWatch an especially important tool for achieving the Lab's educational mission. "We see our education program as a ladder," says Todd Culver, the Lab's education specialist and technical producer for BirdWatch. "First we get people hooked on birds, and then we help them learn what they need to know to participate in the science of ornithology, one step at a time."

BirdWatch is the very bottom rung of the ladder. It's the Lab program with the broadest appeal. Everyone sees birds every day; the BirdWatch goal is to reach out to people, grab their attention, and stimulate their interest in birds. BirdWatch is where folks start climbing up the ladder.

The next step up might be enrollment in the Lab's home study course in bird biology; eventually, people who "know their birds" can collect data for Project FeederWatch or one of the many other bird censusing programs. "Enabling amateurs to make serious contributions to science is where the Lab does some of its best work," Culver concludes.

The Lab's Library of Natural Sounds provides the smorgasbord of bird sounds that makes BirdWatch such an auditory treat, while Lab ornithologists supply much of the commentary. Attention grabbers on BirdWatch range from the seasonal (lovebirds on Valentine's Day) to the bizarre (the world's ugliest bird) to the practical (how to buy the best bird seed). The far-ranging show covers bird biology from anatomy to behavior as well as conservation efforts and current research.

Production is well under way for a second full year of BirdWatch shows. The Lab is pleased to announce that State Farm Insurance will sponsor the program for another year. To find out which radio station near you airs BirdWatch, call the Lab's Education and Information Services: (607) 254-2403. □

News from Project FeederWatch

Pine siskins went bust, but plenty of other birds visited backyard feeders this past winter — that's the preliminary report from Project FeederWatch. The continentwide survey of feeder birds, cosponsored by the Lab and Ontario's Long Point Bird Observatory, is now in its fourth year of operation, with over 7,000 volunteers across the United States and Canada recording backyard bird sightings for the popular project.

The decline in siskin abundance this winter was expected, says project coordinator Erica Dunn, because siskins were unusually plentiful the year before. Siskins usually winter in northern and montane areas, but sometimes "irrupt" or invade areas to the south or downslope when their favorite foods—alder and fir seeds—are in short supply. Seed crop failures, and hence invasions, rarely occur two years in a row.

FeederWatchers also noted declines in two other irruptive species, common redpoll and red-breasted nuthatch. But despite a widespread perception by project participants that feeders were deserted this past winter, a preliminary analysis of midwinter data showed no significant declines in the numbers of most other bird species. Black-capped chickadee, downy woodpecker, purple finch, and evening grosbeak actually showed increases in their abundance and/or distribution continentwide, with midyear abundance values for evening grosbeak reaching record levels.

Although the songbirds that FeederWatchers study come to dine, some of them end up as dinner. The spring 1991 issue of the project's newsletter carries a special report on predation at FeederWatch sites. Among the highlights: feeder birds were killed by predators at over one-fifth of the sites over the past year. Cooper's hawks and sharp-shinned hawks together accounted for about 45 percent of the 946 predation incidents reported, but at least 12 other bird species, including American crows, scrub jays, and various owls preyed on feeder visitors. Cats accounted for 23 percent of the predation incidents; a dog, a snake, and a wood rat were among the other predators observed.

If you feed birds in your backyard and you'd like to contribute to this international effort to monitor bird populations, now is the time to sign up for the 1991–92 FeederWatch season. For more information write to: Project FeederWatch, Room 55, Cornell Lab of Ornithology, 159 Sapsucker Woods Road, Ithaca, New York 14850. ☐

Cooper's hawk, one of the predators spotted at FeederWatch sites.

MASLOWSKI PHOTO

The Elephant Communication Project

Katy Payne and Bill Langbauer of the Bioacoustics Research Program carried out a six-month expedition to Zimbabwe in 1990 as part of their continuing studies of elephant communication. The expedition provided an opportunity to work closely with a number of people from Zimbabwe's National Parks and Wildlife Management Department (famous for its wildlife utilization program) including Rowan Martin, assistant director of research in Zimbabwe's national parks. The expedition was based at the Sengwa Wildlife Research Institute near Gokwe, Zimbabwe.

The team's goal was determine whether the ability of groups of elephants to coordinate their movements over long distances is related to their use of infrasound (very low frequency sounds). To assess this relationship the researchers needed to record both elephant vocalizations and movement patterns. So they outfitted 16 adult female elephants from 13 different family groups with specially designed radio collars. These collars not only emit a "beacon" that permits the scientists to track the collar-wearing animals' movements, they also broadcast the sounds each elephant makes. Each day at Sengwa, members of the team simultaneously monitored the vocalizations and the movement patterns of the collared groups, while others, with the help of Zimbabwean trackers, followed elephants on foot, making notes on their behavior.

The researchers also wondered whether elephant groups that exchange particular sorts of calls and make synchronized movements might be related. To determine genetic relatedness, Rob Roy Ramey, a graduate student in Cornell University's department of Ecology and Systematics, collected blood samples from the collared elephants. The samples are now being analyzed using DNA fingerprinting, a technique which can reveal close genetic relatedness.

Now that they're back in Ithaca, Payne and Langbauer are busy coordinating the truly elephantine quantities of data. Langbauer is developing the computer programs that will be needed to analyze the recordings and mapping movement patterns over time, looking for apparently coordinated movements between groups. Payne is fitting the behavioral data to the movement maps. An in-depth report on the Elephant Communication Project will appear in a future issue of *Birdscope*. ☐

AROUND THE LAB

- **Gregory Butcher**, director of Bird Population Studies, attended the annual meeting of the American Ornithologists' Union in June, 1990, at the University of California, Los Angeles. He spoke on "Variability of Incubation Periods in the Eastern Bluebird and the American Robin as Calculated from Nest Record Cards."

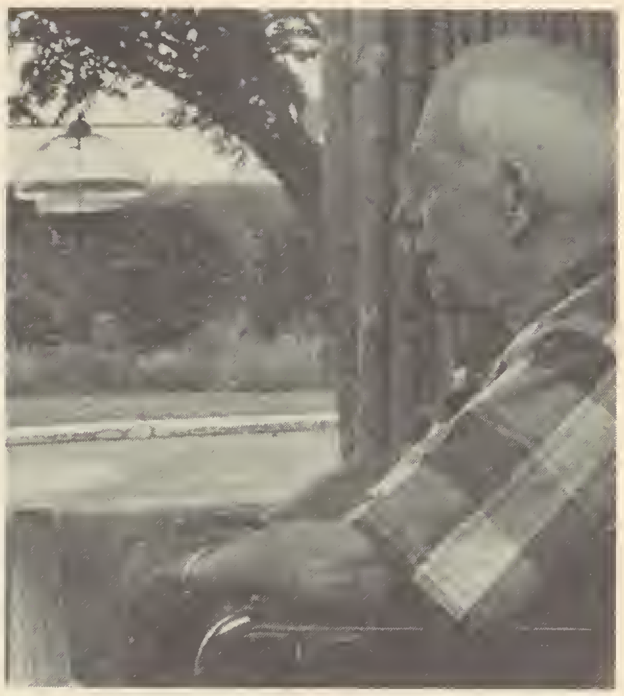
- Research ecologist **Charles R. Smith** and **Gregory Butcher** attended a workshop titled "Conservation of Neotropical Migratory Birds," during December, 1990, in Atlanta, Georgia. The purpose of the conference, sponsored by the National Fish and Wildlife Foundation, was for the U.S. Fish and Wildlife Service, U.S. Forest Service, and various nongovernmental organizations to develop a 10-year plan for coordinating research on neotropical migrants.

- Gregory Butcher and Lab director **Charles Walcott** recently made invited presentations to the Linnaean Society of New York. Dr. Butcher spoke in October, 1990, on "Raptor Population Dynamics from Christmas Bird Count Data." Dr. Walcott spoke in February 1991 on "The Many Mysteries of Bird Navigation."

- Education and Information Services (EIS) welcomes two new staff members. Associate Editor **Nathaniel Comfort** contributes to all Lab publications, and has special responsibility for a new effort to reach over 1,000 bird clubs nationwide with Lab press releases. Nathan completed his M.S. degree in neurobiology and behavior at Cornell this year. Research Aide **Tim Dillon** takes primary responsibility for the Lab's library operations. He'll also assist "Answer Man" Todd Culver in fielding bird questions from Lab members and in researching topics for our BirdWatch radio program. Tim earned his B.S. in natural resources at Cornell.

- The Bioacoustics Research Program also has a new staff member. Computer programmer **Steve Mitchell** joined BRP last fall. Steve does the programming for the program's new birdsong recognition software. He comes to us from Cornell's Computer Science Department.

- Over 100 students flocked to enroll in **Charles R. Smith**'s course this spring. Titled "Bird Biology and Conservation," the course is offered through Cornell's department of Natural Resources. **Christopher W. Clark**, director of the Bioacoustics Research Program, is also teaching a course this spring. This one is in Cornell's department of Biological Sciences and is titled "Bioacoustic Signals in Animals and Man."



JOHN HINES

Add A Friend

Spencer Knight

The lives of the elderly are enriched when an avian friend comes to call

Imagine an elderly nursing home resident who had not spoken a word to anyone—family, friends, or attendants — for over two years. How alone and withdrawn she must have felt. Happily her isolation came to an abrupt end when a songbird flew past and landed on the feeder outside her window. She pointed a finger and said, "There's a bird." Amazing to think that this small bird's presence changed the entire pattern of her existence.

This remarkable incident occurred in the second week of an experimental study to determine whether the lives of nursing home patients could be improved and enriched by encouraging them to take an interest in feeding songbirds. The group that set up the study—professionals in the fields of ornithology, biology, psychology, aging, nursing, and publishing — wanted to find a way to provide relief from boredom and monotony for the ever-increasing numbers of senior citizens confined to nursing homes. The 12 group members combined their knowledge and experience and put the plan into action.

They named the project "Add A Friend." The friend in this case was a wild bird who would call every day to enjoy an abundance of free food. To help nursing home residents understand what the project was all about, the group prepared a simple brochure printed in large type. The front page invited residents to "Have a friend call on you every day." Inside, the pamphlet provided suggestions on how to enjoy bird watching. In addition each resident received a colorful Audubon folder showing 26 common birds and a Peterson guide for beginning bird watchers.

Table 1. The effects of bird watching on mobility, sociability, and activity in residents of three New York nursing homes.

Observation period	Percentage of residents showing:		
	Improvement	*No Change*	*Decline*
1	32%	60%	8%
2	55%	40%	5%

Three New York nursing homes, each with approximately 50 residents, participated in the study: the Penfield Nursing Home and the Woodside Nursing Home in Rochester, a metropolitan area, and the Newark Manor Nursing Home in the small rural town of Newark. Staff members at each site received a six-page guide, "Feed The Birds," which provided tips on maintaining a high level of bird watching interest in the nursing home residents and suggestions on how to deal with various situations that might arise during the program. To stimulate interest and friendly competition, the nursing home staffs set up charts where patients could record each new bird and the name of the person who first spotted it.

The group divided the experiment into two three-week periods with a pause in between in order to compare results and allow an adjustment period for the patients. All nursing home residents, except those who were ill, had emotional problems, or were confined to bed, were encouraged to participate. Test materials at each location included the following: three new feeders, 50 pounds of black oil sunflower seeds, a new 30-gallon metal drum with a tight metal cover for seed storage, bleach and a long-handled brush for cleaning feeders, and an adequate supply of brochures for staff and patients.

A random sample of 27 nursing home residents were monitored weekly for noticeable changes in their behavior. Nursing home staff recorded the residents' mobility, sociability, activity, and cooperation and evaluated them weekly for changes (Table 1).

The positive impact of the "Add A Friend" program was evident by the second week of the experiment, even before any figures were available. The residents, the families who happened to visit at the time, and the staff all reported distinct attitude changes among the patients. The common bond of bird watching seemed to promote better communication, closer friendships, and increased self-confidence.

People who reviewed the report on the first three-week study period were excited about the figures, though a few were skeptical that looking at birds could make such a difference. But they all became believers by the end of the second three-week period. Most agreed that the project was an unqualified success.

Though this project was never intended to be a rigorous scientific analysis, the results are still suggestive and should inspire other nursing homes to try similar programs. If you are a nursing home staff member and would like to initiate the same kind of program at your facility, contact the Cornell Laboratory of Ornithology Education and Information Services: (607) 254-2403. □

ABOUT THE AUTHOR

Spencer Knight's involvement with the Laboratory of Ornithology stretches back to its earliest days. In fact, if you look at the picture of our building dedication ceremony in 1956, you'll find Spence there, standing alongside the Lab founders and other dignitaries. Appointed to the Lab's Administrative Board more than 30 years ago, Spence has always been a boundless source of encouragement and support for Lab education programs, such as the home study course in bird biology.

The nursing home bird-feeding experiment would probably never have gotten off the ground without Spence Knight's involvement. He put all his energy into the project, rallying support and following the experiment through to its successful conclusion. With more vigor and enthusiasm than most people half his age, Spence is an inspiration to the rest of us at the Lab.

Spencer Knight is the retired chairman of the former Stuart Industries and co-founder of the C. H. Stuart Foundation. He and his wife, Mabel, live in Newark, New York.

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THE LIVING BIRD

Quarterly

Summer 1991

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For more information about our birding tours, write or call today: Nora Ettinger, Tour Coordinator, Cornell Laboratory of Ornithology, 159 Sapsucker Woods Road, Ithaca, New York 14850. Phone (607) 254-2423

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THE LIVING BIRD *Quarterly*

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Front cover: From a prominent perch, a northern roadrunner croons a love song that only a female roadrunner could appreciate. For a closer look at this animated feather duster, turn to page 20. Photograph by Steve Bentsen.

Back cover: More amour. . . . In case you've ever wondered what it's like to be courted by a male red-necked grebe, here's a female grebe's-eye view of a red-necked Romeo in action. Photograph by Tim Gallagher.

Right: At home on the range or in a stand of cactus, this member of the cuckoo family is a common sight in the American Southwest. Photograph by Jeff Foott.

SPECIAL BIRD SONG ISSUE

FEATURES

10 OBSERVATIONS ON A 264-YEAR-OLD ORNITHOLOGIST *by Glen Chilton*
Nearly two centuries after his death, the bird song research of Englishman Daines Barrington is still valid.

14 HEARING IS BELIEVING *by Don Stap*
An ornithologist with a rare gift for bird song identification uses his ear as a tool for rainforest conservation.

20 CACTUS CUCKOO
Wildlife photographer Jeff Foott presents a portrait gallery of the Southwest's most popular roadside attraction.

26 FROM BIRD SONG TO THE PHILOSOPHY OF LIFE *by Nathaniel Comfort*
Fernando Nottebohm's pioneering studies into the workings of the avian brain may lead to breakthrough treatments for humans.

DEPARTMENTS

4 159 SAPSUCKER WOODS ROAD

5 BIRDNOTES

6 MY TURN *by Bob Marcotte*
Don't give birding a bad name. When a rare bird shows up, keep off the grass.

7 FOCUS
The bells are ringing in Central America wherever the three-wattled bellbird opens its beak.

8 ANTHROPOMORPHOUS *by Cynthia Berger*
In which we learn how chief inspector Crawford Greenewalt cracked "The Case of the Singing Syrinx."

30 CRITICS' CORNER
In this issue, our critics take a peek through the new Leica binoculars, and also review an art book and a guide to wildlife photography.

34 IN THE FIELD *by Jack Connor*
New hope for the tone deaf! You too can become an ear birder.

36 BEYOND THE FIELD GUIDE *by Richard E. Bonney, Jr.*
Raptor watchers from coast to coast gather vital data on hawk migration. Find out how you can help.

38 THE CATBIRD SEAT *by Pete Dunne*
There ain't no cure for the old binocular blues — except to buy yourself a new Uberglass.

p. 20 Beep! Beep!

Apologies to "Betty at The Point"

Prodded by a friend, I just reread my column, "To Be Chosen by Phoebes" (Winter 1991), and realized that what I intended to be a light anecdote came across instead as mean-spirited tattling on Aunt Marney and "my friend Betty at The Point." In the case of the latter, I compounded my clumsiness by making it sound like she kills her phoebe hatchlings with mosquito poison habitually if not purposefully. To set the record straight, Betty — who has been an ardent naturalist, environmentalist, and phoebe advocate at least twice as long as I have — fogged her yard (not her porch) for mosquitoes exactly once.

I, on the other hand, did not disrupt my phoebes once. I did it three times: First, when I hard-boiled the eggs by forgetting to turn off the porch light; second, when I caused the nest to crash by unscrewing the bulb; and third, when I flushed the brooding hen into the living room, nearly causing her to abandon her clutch. With friends like that, who needs Marney's cats?

Ted Williams
Grafton, Massachusetts

Leading Us On

Jack Connor's column ("Subversives Among Us," Winter 1991) touches on something that has spoiled many field trips for me and my friends.

Except for backyard birds, I am a far-from-knowledgeable birder. I go on birding walks in order to learn.

What happens? The leader takes us single file down a trail. When he sees something of interest, he stops (with his back to us) and puts his binoculars to his eyes. With his hands now covering his mouth, he also lowers his voice, in order not to disturb the bird.

If he sets up his scope, by the time even half of the party gets a chance to look through it, he is showing his annoyance at having to repeat the same thing for the tenth time.

At the end of the trip he is peeved with those who claim not to have seen very much, when he has seen a long list of interesting species.

It is the leader who drives us to looking at what is on the ground instead of what is in the air. We want to get some knowledge on this trip, even if it is not of birds.

Phyllis Simpson
Haverford, Pennsylvania

No Dearth of Dancers

Having marveled at the woodcock's springtime dance when I lived in Ithaca, New York, and New Hampshire, I found it especially poignant to read Aldo Leopold's essay ("Sky Dance," Winter 1991) just after learning that woodcock populations have declined by up to 36 percent over the past 23 years.

The U.S. Fish and Wildlife Service, U.S. Forest Service, and Ruffed Grouse Society, however, have joined in an effort to help landowners manage their woodlands for woodcock. Copies of the recently completed Woodcock Management Plan are available from the Office of Migratory Bird Management, USFWS, MS 630, ARLSQ, Washington, D.C. 20240. You might want to share this news with your readers in hopes that some can help improve habitat, to "be sure that, come April, there will be no dearth of dancers in the sunset sky."

Carolyn Jervis
Los Alamos, New Mexico

GREETINGS FROM SAPSUCKER WOODS

Moving to the Northeast from California has led me to a major crisis of confidence in my birding abilities. I used to think I was pretty good. I prided myself on being able to pick out the distinctive shape and flight style of a prairie falcon at the extreme limits of binocular vision on the vast expanses of the Southwestern desert. At the beach I knew all the sizes, shapes, colors, and bill types of the many shorebirds. Ditto with the ducks and wading birds at the marsh.

Identification was easy back there because I could usually see the birds. But a few walks along the trails at Sapsucker Woods this spring convinced me that birding is more of a listening than a seeing game in these parts. And at bird song identification, my skills are poor at best.

A recent birding trip with a friend really pushed the point home for me. We arrived at daybreak, just as the dawn chorus was getting into full swing. To me it was an undecipherable cacophony of bird sounds. Sure, I picked out the calls of a distant raven and a red-shouldered hawk, and the drumming of a ruffed grouse. But my friend, meanwhile, had identified by ear a hermit thrush, a winter wren, a brown creeper, a pair of dark-eyed juncos, and some golden-crowned kinglets.

This went on all morning. And to make matters worse, besides naming the species, he usually told me what the bird was communicating with each sound. The *churt* call of the hermit thrush meant the bird was alarmed. The *zeet* call of a dark-eyed junco was an aggressive signal. The realization quickly dawned on me that I was lacking a major birding skill — being able to identify birds by sound alone.

Fortunately for me, there are plenty of people here at the Lab to help me develop as an "ear" birder. Almost from the time it was founded, the Cornell Laboratory of Ornithology has been synonymous with bird song study. The Lab's Library of Natural Sounds has the largest collection of recorded bird sounds in the world.

This special issue of *The Living Bird Quarterly* is devoted almost entirely to bird song. We look at the history of bird song study, the physiology of bird vocalizations, how bird recordings are used as a tool for conservation in tropical rainforests, and more. And in case you want to join me in memorizing bird songs, contributing editor Jack Connor tells how to use bird audio tapes effectively to boost your skills. We hope you'll be entertained and enlightened by the articles, and that perhaps you'll be inspired to learn more about bird song. It could open an entirely new area of birding enjoyment to you.

Tim Gallagher, Editor

We welcome letters from readers. Address letters to:
The Editors
The Living Bird Quarterly
159 Sapsucker Woods Road
Ithaca, New York 14850

Golden Sebright bantams by Christopher Evans

Viewing videos for science

Chicken T.V.

Video-viewing chickens offer the promise of a revolution in the study of visual communication. Researchers Christopher S. Evans and Peter Marler of the University of California, Davis, recently tested whether captive birds would call to video images as if they were the real thing. The results of their study were reported in *Animal Behavior* (41:17–26; 1991).

In designing the study, Evans and Marler took advantage of an avian characteristic called, appropriately, the audience effect: a rooster that spots a possible predator will sound the alarm, but he'll call more if he has an audience (i.e., female chickens). Evans and Marler flew hawk silhouettes over caged male bantam chickens that had as an audience either live female chickens or their video images. In another experiment, the researchers modified some videotapes to separate out the chickens' response to the visible and audible components of the tapes.

The experimental chickens did not distinguish between live and canned audiences. The birds did give more alarm calls to a videotape with sound than to a silent video or to chicken sounds alone; they called about equally in response to the latter two stimuli.

Historically, studies of visual communication have used stationary or moving models or live animals whose appearance has been manipulated. Videotape allows researchers to manipulate visual signals while keeping the overall effect realistic.

Owed to a Nightingale

For musician Joyce Lindorff, a nightingale's moonlit serenade has solved the mystery of a 17th-century composition named for the sweet-singing bird. Lindorff, a performing harpsichordist, had concluded that the Baroque work by Allesandro Poglietti allowed performers great freedom of interpretation. Then, the night before she was to play the complex piece at the Medeci Palace in Italy, Lindorff was awakened by a nightingale singing outside her elegant, balconied room. Nature's sounds revealed to her what dry book work could not: exactly how Poglietti intended the piece to be performed.

The lively work, *Rossignolo*, is a collection of regional dances. Throughout the various sections a nightingale can be heard — as if the bird were singing outside the window of the ballroom. Poglietti, court organist in 17th century Vienna, composed the collection in 1671 as an anniversary gift to Emperor Leopold I and his wife.

Lindorff, a visiting fellow at Cornell University, presented her findings and performed the work at the April 1991 annual meeting of the Southeastern Historical Keyboard Society in Winston-Salem, North Carolina. She says Poglietti imitated many natural sounds in his works, but particularly the songs and calls of birds. Other compositions feature the songs of canaries and cuckoos, and one entire work is titled, "On the Cries of Chickens."

Leaden Loons

Lead poisoning is a deadly problem for paint-eating children, birdshot-eating ducks — and now common loons, as well. Tufts University veterinarian Mark A. Pokras analyzed tissue from 14 adult loons found dead near New England lakes in 1989 and 1990. He concluded that 56 percent of these loons died of lead poisoning. Autopsies revealed that all of the lead-poisoned birds had swallowed fishing sinkers.

Adult loons will gulp down rounded quartzite pebbles and hold them in their gizzards to aid digestion; the lead fishing weights are roughly the same size as these pebbles. Scuba divers report that the bottoms of popular New England lakes are often paved with fishing debris, including lures and sinkers. No studies have been done yet to determine whether loons deliberately swallow sinkers (mistaking them for gizzard stones), or inadvertently swallow them along with previously hooked fish.

The poisoning of breeding adult loons may pose a serious threat to New England populations, Pokras warns. Great Britain has already banned lead sinkers, implicated in swan poisonings there. Will loon lovers here be lobbying for similar legislation soon?

Neotropical Initiative

The Cornell Laboratory of Ornithology will be participating in a broad-based initiative to promote monitoring, research, and management for neotropical migrants — birds that breed in North America but winter in the West Indies or Latin America. In March 1991, a group of federal governmental agencies signed a Memorandum of Agreement (MOA) to form an Interagency Neotropical Migratory Bird Committee.

The U.S. Fish and Wildlife Service and the U.S. Forest Service are taking the lead in the initiative; other signatories to the MOA include the Bureau of Land Management, National Park Service, Environmental Protection Agency, and Agency for International Development. A number of nongovernmental organizations will join the Laboratory of Ornithology in contributing to the initiative, including The Nature Conservancy, National Audubon Society, and Smithsonian Institution.

Both the National Fish and Wildlife Foundation and the International Council for Bird Preservation are lobbying Congress for additional funding for the neotropical bird initiative. You can help by writing to urge your representative and senators to support the initiative.

WEARING OUT OUR WELCOME

Bob Marcotte

New this issue in The Living Bird Quarterly, *"My Turn" offers our readers the chance to speak out on issues that concern the birding community.*

When I spotted the flycatcher with the incredibly long tail, I was jubilant. I knew it was a good bird. But I didn't know the bird was *that* good — that the sighting would make the North American Rare Bird Alert. Or that birders from 13 states and Canada would descend on Hamlin, New York, to see a fork-tailed flycatcher that should have been in Brazil.

I had no such inkling that first afternoon — nor did the Moscow Road residents who gathered to see what all the excitement was about. The big difference between us was that I could go home. I didn't have to live with the bird (and the birders) for the next eight days. The neighbors did. And for some of them, it became a trying experience indeed.

Not that the birders who came to observe the flycatcher did anything egregiously wrong. The birders I saw were well behaved. They did not wander uninvited on private property. They did not litter. They were not boisterous or noisy. They parked along the grassy shoulders of the rural two-lane road and stood patiently with their spotting scopes, binoculars, and zoom lenses. They *oohed* and *aahed* as the magnificent bird put on its show, tail feathers streaming outward every time it swooped to snatch an insect in midair.

One Moscow Road resident seemed to enjoy the birders as much as the birders enjoyed the flycatcher. He brought them free coffee. He invited them into his home when the flycatcher briefly took up residence in his yard. He even put up a makeshift registration platform by the road.

But for other neighbors the novelty quickly wore off. One woman was almost broadsided when she backed out of her driveway. She couldn't see the oncoming car because her view was blocked by birders' cars parked along both sides of the road. Another neighbor bemoaned his loss of privacy. His dog barked every morning when the first birders arrived, awakening his family. And the grassy shoulder he had maintained soon became rutted and muddy. He and another angry neighbor told me that birders were among the most inconsiderate people they had ever met.

Some birders insist that problems like these are unavoidable. After all, they contend, road shoulders *are* public rights of way. That's not the point. Or if birders choose to make it a point, it's a dangerously myopic one.

JOE McDONALD

We need to cultivate public goodwill. We have environmental causes that are far more important than getting a peek at a rarity. If we turn the public against us, those causes are bound to be hurt.

So if neighbors feel aggrieved, let's try to accommodate them. Let's be as concerned about their feelings as we are about chalking up another lifer. And never mind the legal technicalities of who can park where.

Let me offer some suggestions. If a rare bird has been sighted on private property, or in a residential area, size up the situation before you even get out of your car. If there is no obvious public parking spot, drive until you find a paved shoulder, or a mall, or some other parking area. If a bird is worth driving hundreds of miles to see, it ought to be worth a short hike.

Take no more time than you absolutely need to get a good look at the bird. Then leave. Don't turn a sighting into a social gathering at the expense of the local residents. And if you live in the area, avoid returning day after day. That just adds to the congestion.

My other suggestions are for local birding organizations. Start thinking now about what to do if a rare bird takes up residence in an area where the interests of birders and neighbors are likely to clash. Designate a club member to serve as a liaison with affected property owners. If problems develop, try to find compromises. For example, you could organize shuttles to and from the site to keep the traffic manageable. And keep birders posted, through local and national hotlines, of any precautions they should take.

I think ill will can be avoided if we, as birders, make an effort to listen, to show we care about the feelings of local landowners.

Birders can't afford to get a bad reputation. If we do, a lot of the causes we're associated with — appreciation of the environment, preservation of habitat, protection of endangered species — could suffer as well. □

Bob Marcotte, who spotted the flycatcher on October 7, 1990, is a Rochester, New York, newspaperman who has been birding seriously for three years. He thanks his birding mentor, Kevin Griffith, for sharing his thoughts on birding etiquette.

Take your turn! Submit your comments (typed, double-spaced, please) to:

My Turn
The Living Bird Quarterly
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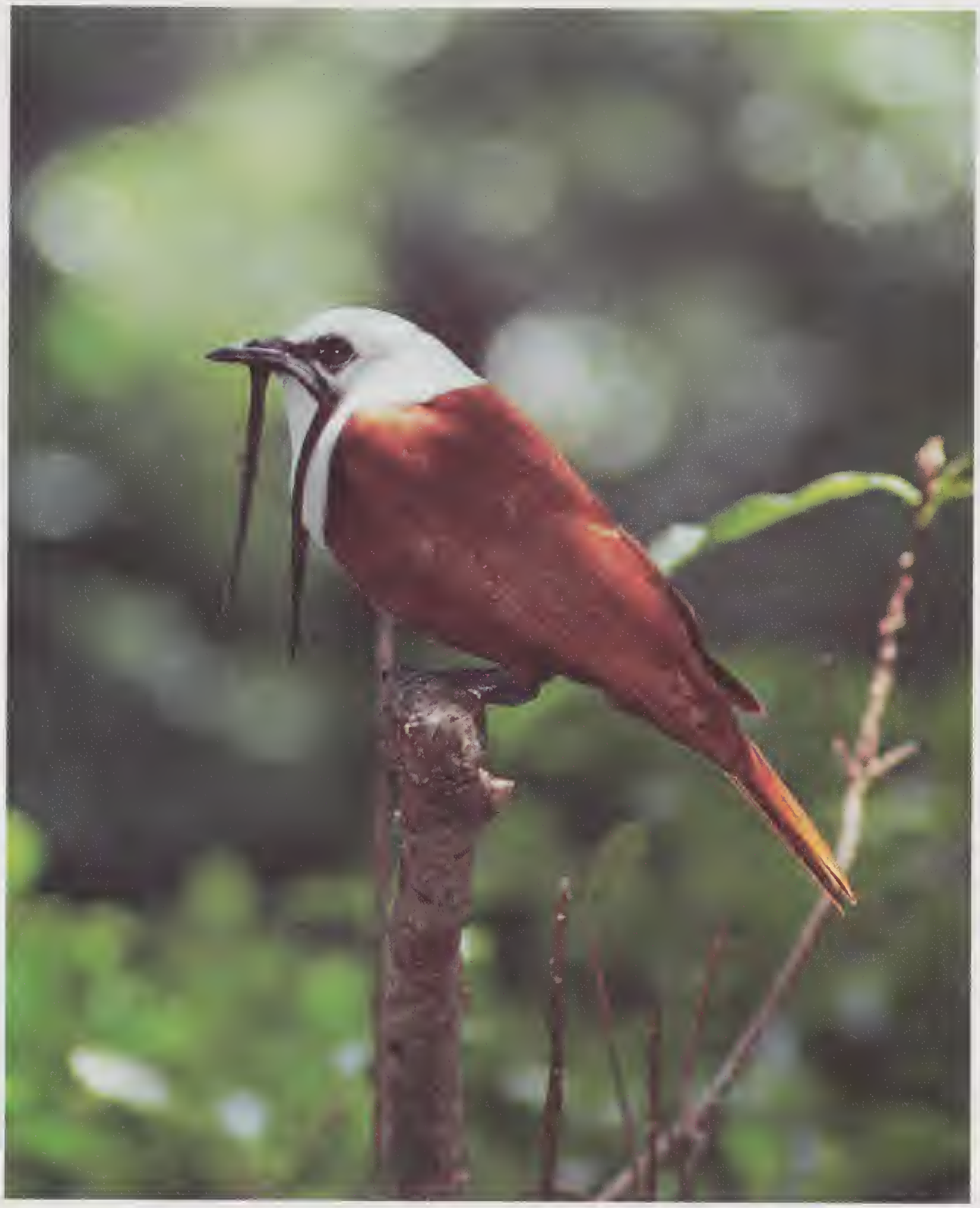


FRANK JOYCE

Sex A-Peal

To attract a mate, the male three-wattled bellbird belts out an explosive, metallic *bonk*. He opens his beak so wide to call, the lower mandible practically touches his breast. The deep bell-like sound, the loudest of all known bird calls, carries for almost a mile in the mountain forests of Central America.

Although the snow white breast and dangling, wormlike wattles make him a photogenic prize, the bellbird usually eludes would-be photographers. Males call and display from perches high in the forest canopy, invisible from the ground. Biologist Frank Joyce used rock climbing gear to scale a tree in the forests of Monteverde, Costa Rica, to capture this rare portrait.

— C.B.

THE CASE OF THE SINGING SYRINX

Cynthia Berger

Crawford H. Greenewalt's interest in photography led, somewhat indirectly, to his studies of bird song. Here Greenewalt photographs a waxwing nest in the Lab's Sapsucker Woods Sanctuary.

DAVID G. ALLEN

Like clues in a dime-store detective story, the physical evidence was plentiful and apparently unambiguous. The pieces fit together neatly. Other investigators had come up with explanations —but none seemed entirely plausible. The nation's finest minds couldn't solve the mystery.

In the best detective novel tradition, the protagonist seemed unsuited to the role of chief inspector. Although highly educated, he was not formally trained in this particular field of investigation, and his other, official obligations occupied much of his time. But his agile, determined mind could not let the problem rest.

The mystery was how birds sing. Ornithologists over the years had dissected countless avian gullets, and the cumulative experience had left no question as to which parts of their internal anatomy birds use to make sounds. Although in humans the larynx is the "voicebox," in birds it serves only to close off the trachea, the path to the lungs, while the bird is eating. The trachea splits in two at the bottom, becoming the twin bronchi which lead to the lungs. At the juncture of trachea and bronchi is a specialized structure, the syrinx. Experiments as early as 1753 had shown that in birds, the syrinx — consisting of paired membranes, one in each bronchus, and the air sacs and musculature that surround them — was the structure essential for sound production.

But how, exactly, did the syrinx generate sound? No one knew.

Enter the protagonist, Crawford H. Greenewalt. A chemical engineer, not an ornithologist, he had graduated from the Massachusetts Institute of Technology in 1922 and joined the Du Pont Company, working first in a Philadelphia laboratory. He was promoted steadily, to group leader, then to research supervisor, then to assistant director of the company's experimental station. Greenewalt's work was instrumental in the development of nylon just before World War II, and in the company's contributions to the national atomic energy program during the war. In 1948 he was elected president of the company, a position he held until 1962, when he became chairman of the board. Greenewalt, now 88 years old and still honorary chairman of the board at Du Pont, is the recipient of numerous awards and medals for his engineering accomplishments. He is also the author of a book on individual creativity in large organizations, *The Uncommon Man*.

This is the bare-bones biography of a man who is himself uncommon; a natural leader and an exceptional engineer. On the surface, however, Greenewalt's energetic career seems to have had little to do with the world of birds. Yet he is responsible for solving some major ornithological mysteries. These problems, not surprisingly, deal with how a bird's body works — what might be considered avian engineering.

Greenewalt became interested in birds by a circuitous route. A passion for orchid growing led to an interest in photography as a means to record plant growth. He then turned his camera to swifter subjects. One summer afternoon in 1953 he was testing a new technique he had developed to photograph birds in flight on a ruby-throated hummingbird in his Delaware backyard. "To my surprise," he later wrote, "wing action was 'stopped' adequately and the pictures were charming and much admired." So Greenewalt approached the American Museum of Natural History in New York with an idea for a book on hummingbirds.

The editorial staff was enthusiastic, and Greenewalt launched a seven-year effort to document hummingbirds in flight. On his own time, in between his considerable business obligations, and with his own money, he flew to Central and South America, logging over 100,000 air miles. On these trips his 250 pounds of specially designed and fragile photographic equipment sometimes occupied a first-class seat while he and his wife traveled tourist.

The end result of Greenewalt's hummingbird odyssey was a masterful melding of technically astonishing photographs and engaging prose that made complex principles easy to understand. The book also established Greenewalt in the world of scientific mysteries as a top-notch private investigator, as he revealed how hummingbird feathers iridesce and how the birds accomplish their acrobatic flight. *Hummingbirds*, published in 1960 by Doubleday and Co., was hailed as "an artistic triumph" and "a blending of art and science."

Then, in the early 1960s, Greenewalt chanced to read a book in which the author outlined several theories of bird song. One was that the song resonates in the trachea the same way it does inside a clarinet or an oboe. But in woodwinds, pitch is varied as the performer covers and uncovers holes in the barrel, changing the instrument's effective length. A sparrow that sang like a clarinet, Greenewalt reasoned, would have to stretch and collapse its neck like an accordion during the performance. He also saw problems with a model that compared bird song to human speech. "These theories," Greenewalt concluded in the 1969 *Scientific American* article which summarized his own studies of bird song, "were totally unacceptable, and I determined, perhaps with more rashness than wisdom, to see if I could find an explanation that did no violence to either the anatomical findings or to the laws of physics."

Where biologists had chosen the anatomical approach to bird song — dissect and examine the voicebox — Greenewalt the engineer opted to dissect the sounds themselves. To do this, he had to somehow measure the physical properties of sound waves.

The photographic workroom that Greenewalt maintained in his gracious Delaware home soon grew crowded with worktables full of electronic equipment. His principle tool was a one-of-a-kind "signal analysis console" that he had engineered to meet his research objectives. Equipped with special filters, the machine could show what frequencies were present in a sound wave more accurately than the ordinary sonographs used in most bird song research. Another essential piece of equipment was an oscilloscope connected to a writing oscillograph. This device printed out pictures of a song's amplitude, or loudness, over time.

Crawford H. Greenewalt used his engineering expertise to solve a major ornithological mystery

As he pursued his investigation, Greenewalt remembered a study from researchers at Bell Telephone that had shown the brown thrasher seems to sing with two voices. Recalling the structure of the syrinx — two separate tympanic membranes, one in each bronchus — Greenewalt concluded that "the question of whether or not a bird can use its two acoustical sources independently [was] vital to the elucidation of the mechanism of bird song." For example, if a bird's trachea does serve as a clarinet-like resonator, then the sounds produced by the vibrations of each of the two membranes should reinforce each other, producing a single, doubly loud sound.

But his sonographs and oscillographs gave no sign that this was occurring. By passing the recorded bird songs through sophisticated acoustical filters, Greenewalt was able to show that a single spectrograph or oscillograph tracing could be separated into two distinct sound sources. This finding could be explained if birds do indeed sing with two voices — if they are able to perform, in effect, an internal duet. Greenewalt proposed a physiological model for sound production in which each functional unit of the syrinx produces sound independently of the other. In 1968 he wrote a book detailing his research, *Bird Song: Acoustics and Physiology*. That volume still stands today as a unique and valued contribution to the study of bird song.

But Greenewalt felt that the case was not closed: concrete evidence for his model — actual measurements of the sounds produced by each side of the syrinx — was still lacking. Of his own investigation, he said, "The criminal did not confess in the last chapter, and the evidence must remain circumstantial, without direct proof . . . I shall patiently await experimental evidence . . . .

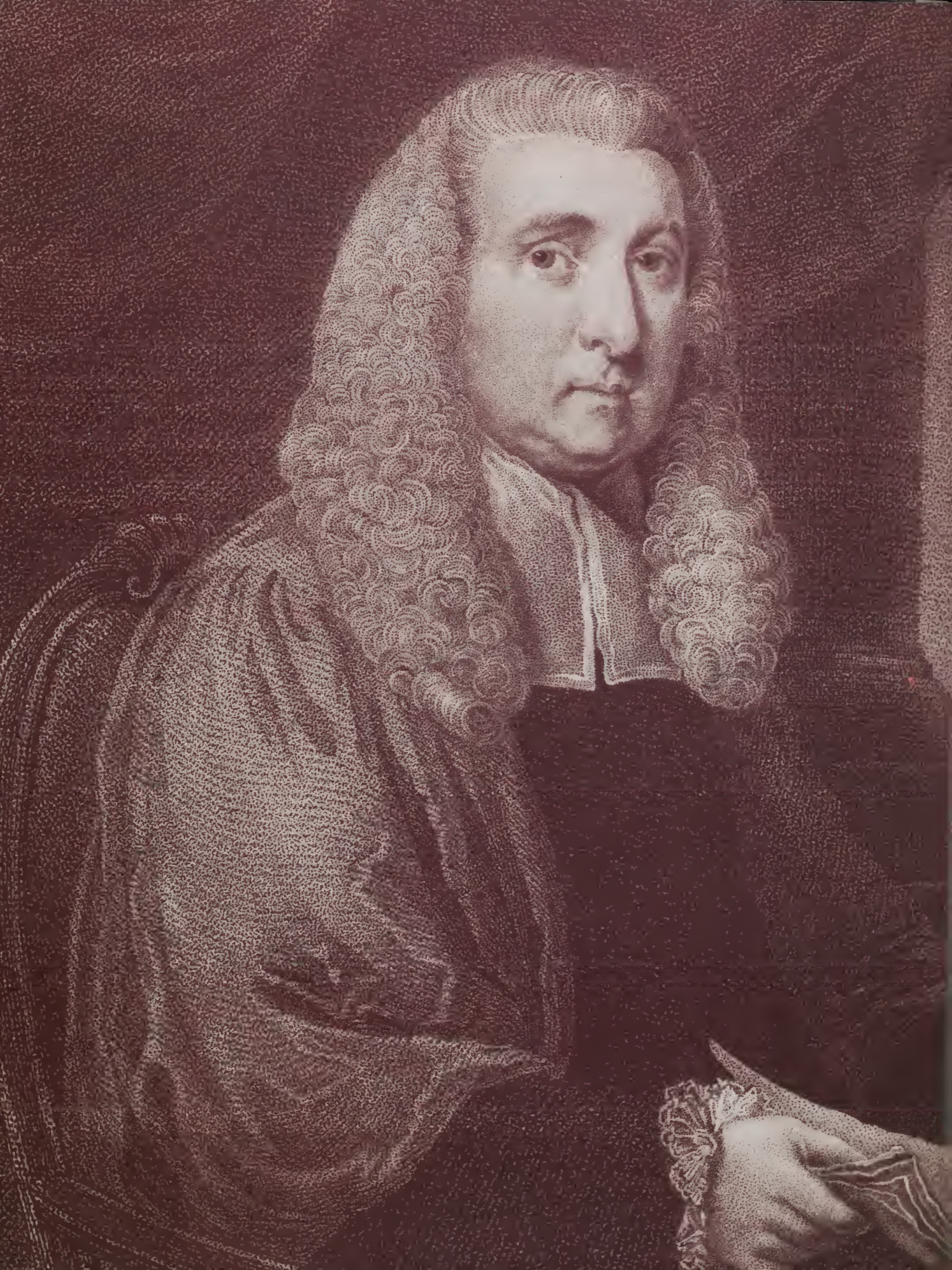
While he waited, Greenewalt was an inspiration to others who were interested in the study of bird song. In particular, he served on the administrative board at the Cornell Lab of Ornithology and was instrumental in bringing the Lab's Bioacoustics Research Program from a good idea to a flourishing and respected program complete with director, state-of-the-art computers, and high-powered, multidisciplinary agenda.

The direct evidence that cracked the case came more than two decades after Greenewalt's book was published, from a researcher named Roderick Suthers at the Indiana School of Medicine. Suthers equipped a catbird, a brown thrasher, and a canary with tiny electronic devices that measured the air flow past the two syringeal membranes. He found that birds can control the flow of air to the two sides of the syrinx independently, and that each side truly produces sound independently. These dual sounds combine to produce what we hear as bird song.

Greenewalt was delighted to have his conclusions confirmed. And how fitting it was that a technological advancement — the miniaturization of sensitive measuring devices — was what permitted the validation of a model designed by ornithology's finest engineer.

But can the file be marked "case closed?" No, for Suthers's work showed that the two sides of the syrinx are not totally isolated from one another. The degree of separation is still being hotly contested by other researchers. One thing is certain, though. Bird song researchers are grateful to Crawford H. Greenewalt for his intuition, perseverance, and uncommon accomplishments.

Greenewalt once wrote of his research efforts, "I am left with a faint uneasiness that it might have been wiser to admire than to understand . . . . I must, however, confess to a predilection for exposition as well as appreciation . . . . Is the rainbow, after all, less radiant because we know that it results from the condensation of moisture?" The renaissance men of detection, from Sherlock Holmes to Spenser, would agree. □



Observations on a 264-Year-Old Ornithologist

Glen Chilton

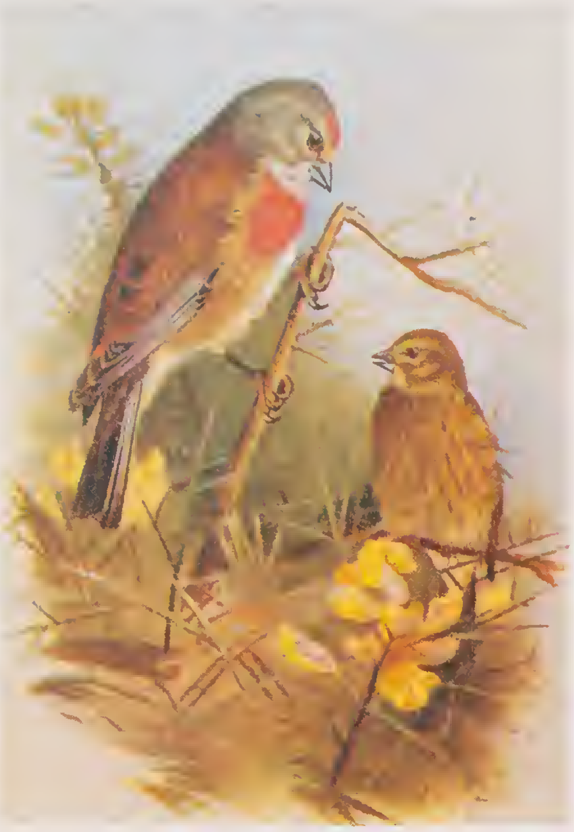
Long overlooked, Daines Barrington's theories of song learning are confirmed by modern research

In *Journey to the Center of the Earth*, Jules Verne's famous 19th-century novel, Professor Lidenbrock traveled to the very core of the planet, following the route of his predecessor, Arne Saknussemm. Lidenbrock sought solutions to the many puzzling questions Saknussemm left unanswered. While Lidenbrock's quest took him deep into the planet, my quest to study bird song has taken me high up in the Rocky Mountains of Alberta, Canada. There I have spent hours hip-deep in snow trying to record the songs of white-crowned sparrows, often against the background noise of gale-force winds. I even have my own version of Arne Saknussemm. He is Daines Barrington, an 18th-century Englishman who conducted pioneering studies of song learning in birds. Though more than two centuries have passed since Barrington conducted his research, a remarkable number of his hypotheses remain valid today.

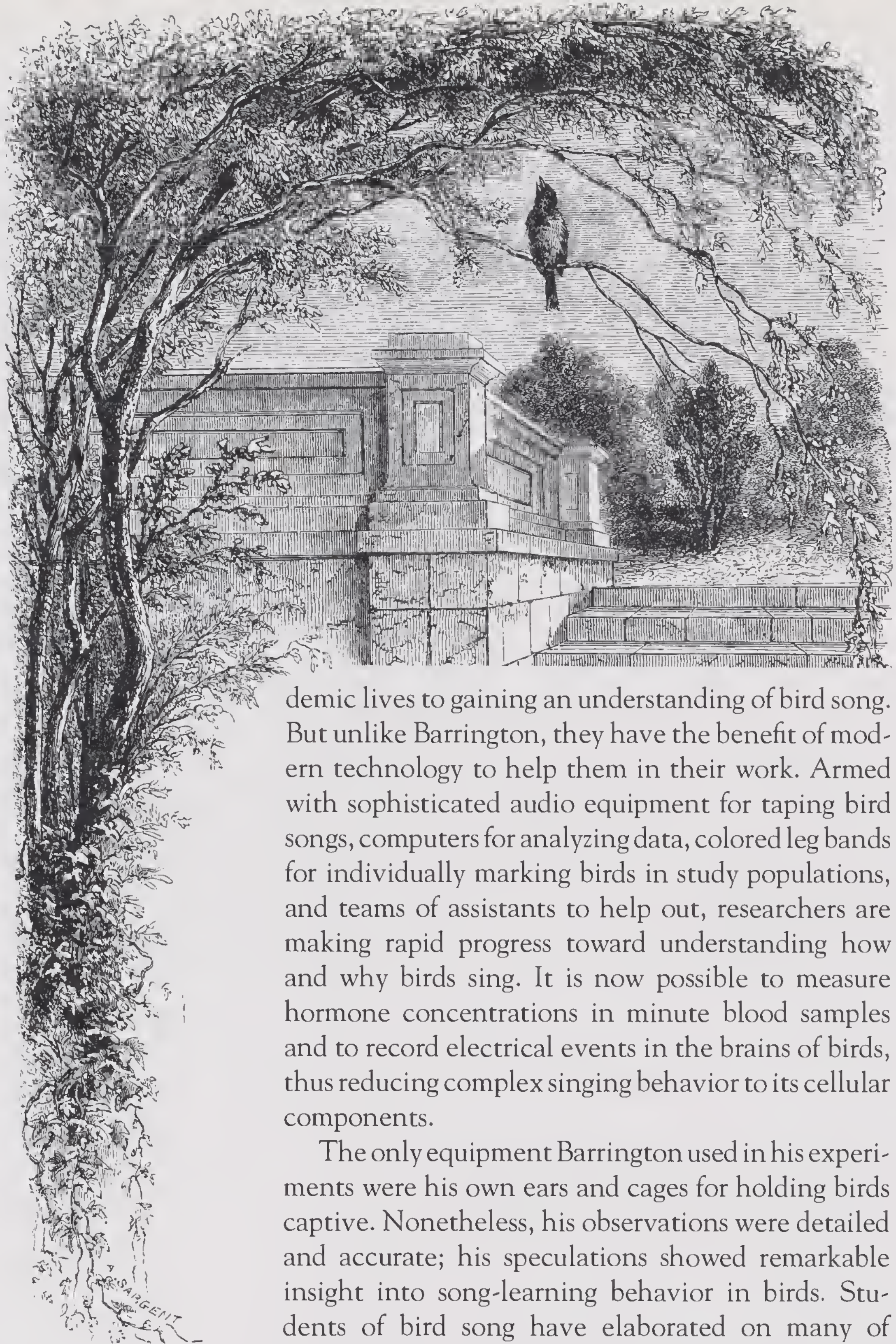
Barrington, who lived from 1727 to 1800, was a man of insight and restless activity. Ornithology was only one small part of his life. He was also a well-known jurist, historian, journalist, student of antiquities, and member of the Royal Society of London. Barrington wrote on such diverse topics as the possibility of sailing to the North Pole, the improbability of a universal deluge at the time of Noah, the history of card playing, and the earliest performances of child prodigy Wolfgang Amadeus Mozart. But he is probably best remembered today as the author of a legal work titled *Observations on the More Ancient Statutes*.

Like many gentlemen of his day, Barrington explored the field of natural history, but he was not satisfied with casual observation or the collection of exotica. He was one of the first to conduct manipulative experiments to study animal behavior. Determining how birds acquire their songs particularly interested him. The results of his lengthy experiments with song learning in birds were published in *The Philosophical Transactions of the Royal Society of London* in 1773 under the title, "Experiments and Observations of the Singing of Birds."

Today, many scientists devote their entire aca-



The linnet, a common European finch, was Barrington's favorite study species.



Using only his ears and cages for captive birds, Barrington made discoveries about song learning that still hold up in the present era of high-tech research.

demic lives to gaining an understanding of bird song. But unlike Barrington, they have the benefit of modern technology to help them in their work. Armed with sophisticated audio equipment for taping bird songs, computers for analyzing data, colored leg bands for individually marking birds in study populations, and teams of assistants to help out, researchers are making rapid progress toward understanding how and why birds sing. It is now possible to measure hormone concentrations in minute blood samples and to record electrical events in the brains of birds, thus reducing complex singing behavior to its cellular components.

The only equipment Barrington used in his experiments were his own ears and cages for holding birds captive. Nonetheless, his observations were detailed and accurate; his speculations showed remarkable insight into song-learning behavior in birds. Students of bird song have elaborated on many of Barrington's points in the intervening years, but have made few major revisions.

Barrington's favorite study species was the linnet, a small seed-eating finch found in the gardens and hedgerows of Great Britain. It was an ideal subject because of its musical voice and the ease with which it adapted to captivity. This combination of characteristics made it a popular cage bird in the 19th century and eventually led to a decline in the bird's wild population. Britain finally enacted laws early in this century to protect the species.

Barrington saw young birds as the key to the study of song learning, and so took nestling and fledgling linnets into captivity. He found that "Nothing is to be expected from a nestling brought up by hand, if he does not receive the proper instruction from the parent cock." Today we know that just as a gosling is best able to learn the characteristics of goose behavior from its parents during a short imprinting period, a songbird is most sensitive to song learning during a short "critical period" early in life.

Researchers in the 1950s determined that nestling male songbirds taken into captivity learned songs from audio tapes most easily in the period from eight days to 50 days after hatching. But birds raised isolated from any bird sounds produced songs at maturity that had only the crudest resemblance to the typical song of the species. In the early critical period for song learning young birds are usually found on their father's territory and under his care, which probably predisposes them to imitating his song.

Another interesting theory of Barrington's was that the typical songs of a particular bird species were "no more innate than language is in man." To prove the point, he tutored young male linnets with the songs of skylarks and woodlarks, and found that each bird learned his tutor's song, not that of the linnet. He also noted that an individual that was imprinted on the wrong song could pass on this song to its offspring.

But these observations misled Barrington. A young bird is not entirely without discrimination in its choice of tutors, and it seems to have a rough idea of what constitutes an appropriate song. From the vast cacophony of bird songs in the wild the young male is able to pick out and imitate the song of its species. Its brain filters out the songs of other birds. But when captive birds are kept in close quarters or in isolation this filter mechanism can be bypassed, which was probably the case in Barrington's experiments.

One remarkable observation Barrington made was that songbirds have regional "dialects" that link them to a place of origin. "Most people who have not attended to the notes of birds suppose that those of every species sing exactly the same notes and passages, which is by no means true," he said. "These differences in the song of birds of the same species cannot perhaps be compared to anything more apposite than the varieties of provincial dialects."

Barrington was not the first to note regional differences in bird song. He was preceded by Baron von Pernaus (1660–1731) of Austria who studied bullfinches. But Barrington *was* the first person to compare these differences with the regional dialects of human languages. Since that time, biologists have found dialects in the acoustic signals of bobolinks,

chickadees, brown-headed cowbirds, yellowhammers, corn buntings, elephant seals, humpback whales, honeybees, and many other species.

What is the function of these vocal dialects? One group of behavioral ecologists believes that an individual's dialect represents a mark of birthplace that can be used by others of the same species when choosing a mate. Perhaps adult females avoid males with strange songs, birds that have dispersed from distant populations. The genes of these foreign songsters may not be well-suited to local conditions.

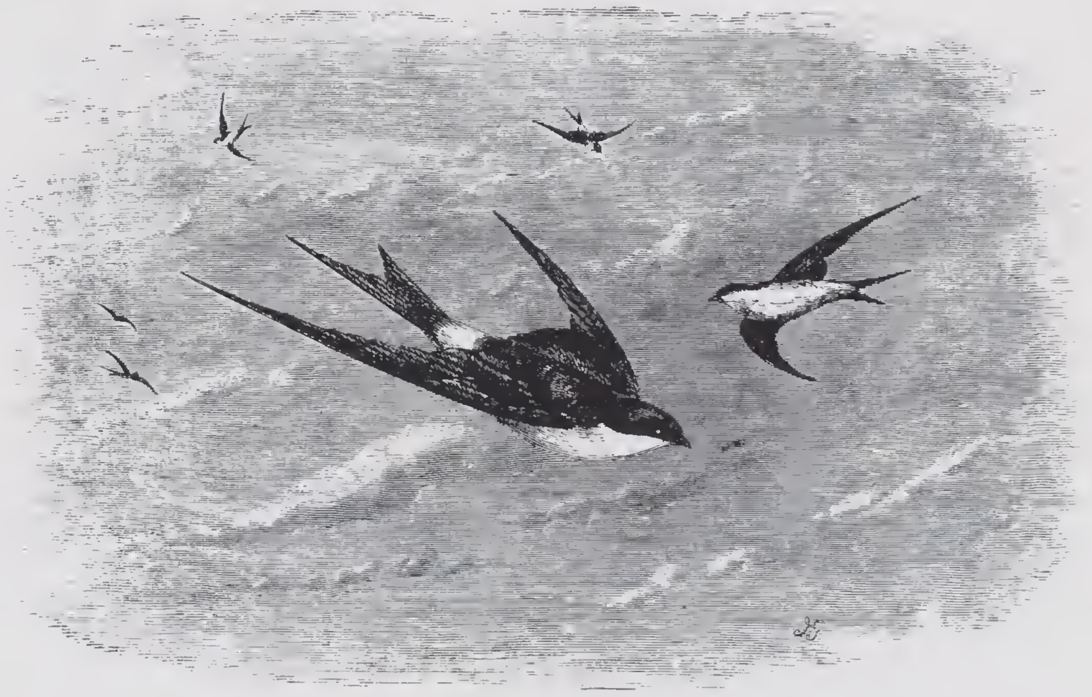
But other scientists feel that dialects are without function; they are merely a by-product of song learning. A male learns from his father just as his father did before him. If a mistake is made and the bird learns a song incorrectly, the error is perpetuated by subsequent generations. In different regions, different errors resulted in different dialects. Barrington's observations appear to support this theory.

"The loss of the parent-cock at the critical time for instruction hath undoubtedly produced those varieties, which I have before observed are in the song of each species," he said. "Because then the nestling hath either attended to the song of some other birds; or perhaps invented some new notes of its own, which are afterward perpetuated from generation to generation, till similar accidents produce other alterations."

Barrington also looked into the reasons why the males of most bird species do all the singing. A young male songbird hears the songs of his father and other adult males in his first autumn. These songs swirl around inside his brain until his own version pops out the following spring. His young sisters hear the same songs, and yet, in most of the 4,000 songbird species, the females don't sing. Barrington made two observations on the vocalizations of domestic fowl that bear on this sexual dichotomy. He noted that castrated roosters do not crow, and attributed this to weakness of the vocal muscles. He also noted that on rare occasions hens produced sounds similar to a rooster's crowing, demonstrating that they knew the vocalization, even though they rarely performed it. If Barrington had combined these two observations, he might have linked sexual differences in vocal ability to the reproductive organs, the principle source of sex hormones.

A number of recent observations further implicate sex hormones in bird song, particularly the male hormone testosterone. Singing waxes and wanes through the breeding season in parallel with changes in testosterone level. In many bird species if a female is given testosterone artificially it will sing like a male. Brain cells that control song are particularly receptive to testosterone, and these cells are more numerous in males than in females. But hormones were not discovered until 100 years after Barrington's death. The link between reproductive organs and song control centers in the brain is so complex that it is not surprising the relationship is only now becoming clear.

Behaviorial ecologists still struggle to explain facets of bird song that puzzled Barrington in his day. For example, birds of different species vary remarkably in the size of their vocal repertoires. A male white-crowned sparrow sings only one song type, repeated hundreds of times a day throughout each breeding season of its four- or five-year life span. In contrast, a male brown thrasher has thousands of different song types and may improvise its repertoire daily. Why the difference? According to Barrington, "Superiority in song gives to birds a most amazing ascendancy over each other." The statement is somewhat cryptic. Today we think in terms of a male songbird's struggle for access to larger or better territories, to more females, or to females of greater reproductive potential. The scientific literature contains many hypotheses that seek to explain the evolution of a large song repertoire, but no explanation proposed to date fully explains why some species have so many songs while others manage with so few.



Not all of Barrington's assertions are valid. He suggested, for example, that swallows hibernate in rivers and ponds each winter.

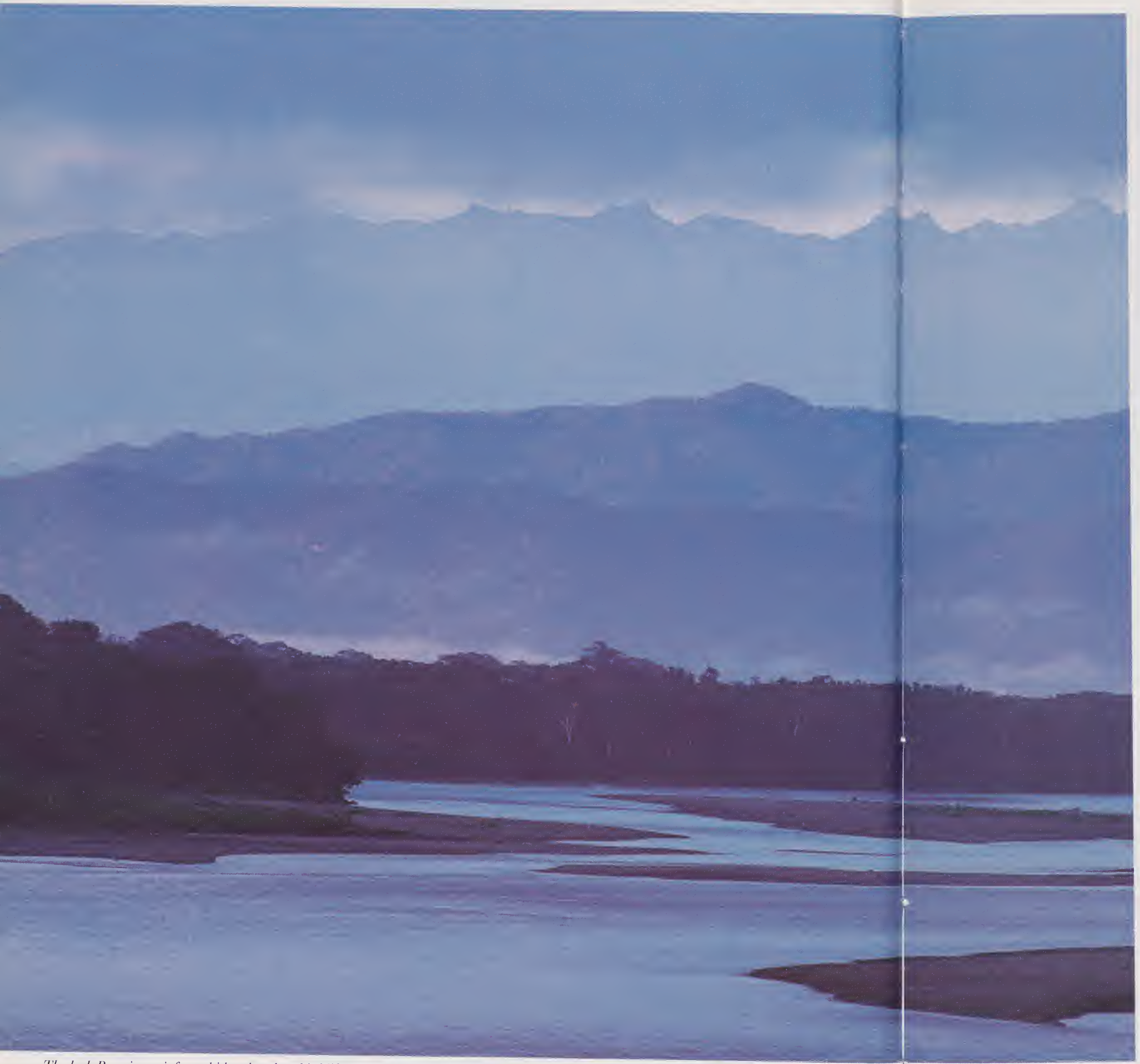
By his own admission, Barrington published too many manuscripts on topics with which he was not sufficiently familiar. He suggested, for example, that long-distance migration by swallows was impossible — that the birds actually went into hibernation in rivers and ponds each autumn. He argued, quite incorrectly, that cuckoos build nests and tend their own young, rather than parasitizing the nests of other birds. The *Dictionary of National Biography* dismisses these pieces he wrote as mere "sketches in the byways of natural history." But Barrington's treatise on song learning in birds is exceptional. Scientists have made very few major changes to Barrington's basic theories in the more than 200 years since they were published.

What kind of mind spawns such insight? I would give anything to share a bottle of port and an afternoon's chat with Daines Barrington. I have so many questions to ask of this 264-year-old ornithologist. □

Glen Chilton investigated dialectical variation in the songs of white-crowned sparrows for his doctoral thesis at the University of Calgary in Alberta, Canada.

Illustrations by H. Giacomelli from *The Bird*, by Jules Michelet (London: T. Nelson and Sons; 1874).

M. & A. DOOLITTLE



The lush Peruvian rainforest hides abundant bird life.

Hearing is Believing

Don Stap

A keen ear and a tape recorder are the newest tools in the struggle for rainforest conservation

Look — a squirrel cuckoo. Right there, about four feet up in those vines. Ten feet back." Ted Parker, an expert on the birds of the new world tropics, was bending forward and pointing into the undergrowth.

I leveled my binoculars on the spot, but what I saw was something like a spilled jigsaw puzzle of greenery. Twisting vines, leaves the size of elephant ears, and a latticework of palm fronds were all jumbled together. The deep shadows in this section of the Peruvian rainforest were more tangible to me than the bird, which I did not see at all.

"Right there," Parker said again. "In that little opening to the left of the dead leaf."

I still could not pick out the squirrel cuckoo. The shapes of the foliage were unfamiliar to my eye. Everything confused my senses. The day before, I had momentarily mistaken a blue morpho butterfly for a bird. Finally, with Parker still giving me directions, I caught a glimpse of the squirrel cuckoo just as it flew off.

This is what comes back to me when I think of the first couple of days I spent in South America — vivid recollections of the birds I did *not* see.

The difficulty of seeing birds in the rainforest is not limited to inexperienced observers. Even veteran ornithologists have trouble. Understory birds are hard to pick out in the shadows, and birds of the canopy layer duck in and out of the lush growth of sun-seeking leaves 80 feet above one's head. Many other birds are simply secretive by nature. Consequently, rather than look for birds, ornithologists listen for them. "For most forest-dwelling birds the main initial form of communication is vocal," Parker told me later, "so being aware of vocalizations is extremely important."

In 1985 I stayed with Parker at a camp in northern Peru. Built next to the Sucusari river, a tributary of the Rio Napo, the camp was surrounded by thousands of acres of virgin rainforest, a perfect place to get an introduction to neotropical birds. Within a few miles of the Sucusari camp there were, Parker said, about 500 species of birds, more than can be found in the entire eastern United States. The diversity of bird life in South America is both exhilarating and daunting. One-third of the world's 9,000 species can be found there. About 1,700 occur in Peru alone.

On that first afternoon at Sucusari I would have been happy to see just a dozen or so of the area residents — a plum-throated cotinga or a blue-crowned trogon, or maybe a thrush-like wren — but as Parker continued to point out birds, I continued to catch only fleeting views of them or not see them at all.

On our walk, I noticed that Parker was not scanning the trees for birds as I was. When I spoke to Roger Tory Peterson about Parker some months later, he commented on Parker's method: "I know one of his tricks is to keep his head down so he won't be distracted by all the little movements in the treetops. He listens intently for the strange or unusual note. If he hears anything that's interesting, then he looks up. Of course, if you're in the rainforest, the ear becomes more important than the eye. And Parker's got one of the best ears I've ever known."

At the end of the day, Parker brought out his pride and joy — a $6,000 Nagra reel-to-reel tape recorder that he lugs with him almost every time he sets foot in the rainforest. The recorder, roughly the size of a small suitcase and anything but lightweight, captures bird songs with great fidelity. Parker has been recording the vocalizations of neotropical birds since 1972, when as a teenage birder in Mexico he had his first experience with tropical birds. "After a few trips I realized it was going to be real tough to see undergrowth birds without a tape recorder," he told me. "You'll be walking along a trail and these birds will be close to the path and singing, but as soon as you

BHL

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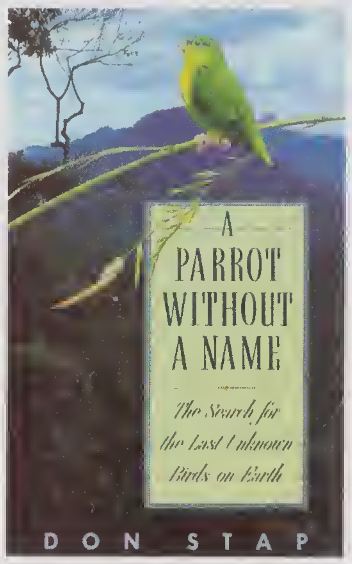
BOOK REVIEW

A Parrot Without a Name

The Search for the Last Unknown Birds on Earth



In this exciting account of tropical exploration, author Don Stap accompanies two remarkable ornithologists to the Peruvian rainforest. Professor John O'Neill, now director of the Louisiana State University Museum, has helped describe more new bird species than any other living ornithologist. Ted Parker has been too busy pursuing birds to pursue advanced degrees, but is unquestionably the world's leading authority on tropical bird biology. Stap provides us with a vivid description of both the frustrations and the ecstasies of their expeditions.

The reader first joins Stap on O'Neill's 1987 expedition into remote east central Peru. For O'Neill, it is the 22nd such expedition in 25 years. Poised on the edge of nowhere, in a town named Pucallpa, O'Neill is overseeing the final preparations for two months of exploration in a largely unknown region. Across the Rio Ucayali and about 100 miles from the foothills of the Andes lies the destination: the Cordillera Divisor, an isolated "island" of mountains surrounded by a sea of tropical lowland forest. Such islands, whether they occur on land or at sea, often harbor unique forms of life. Surely this expedition will discover a bird unknown to science?

The excitement is tempered by urgency, though, because so much of the tropical forests may be destroyed before scientists even know what exists there. Build a single bridge across the Rio Ucayali, complete some roads to the east, and one could drive from Peru through Brazil — across the continent. The destruction of these untouched tropical wildernesses would surely ensue.

The logistics and to some extent the hazards of O'Neill's expedition are substantial. "In Peru it is best to count on things not going as you hope," he cautions. On the day before departure, an expedition member fractures a tooth, and O'Neill rushes her to Lima for first aid. The others press on, but finding cooperative dugout canoe owners to haul 15 people and a ton and a half of supplies upriver is a challenge. Meanwhile, if the water level continues to fall in the Ucayali's tributaries, everyone may have to get out and walk.

At base camp, dangers include deadly snakes, parasitic botflies, and debilitating tropical diseases. A botanist and his co-worker are lost in the wilderness for more than three days. Peru suffers from terrorism and political instability: soldiers spared a previous O'Neill expedition but killed every man in the next village down the road.

But with the bird life so extraordinary, the hassles and risks are worth it! Peru has over 1,700 species, twice as many as all of North America. The spectacular bird sightings start on the trip upriver. And the gasps and exclamations continue as expedition members collect specimens and bring them back to camp. Each prize is respectfully prepared as the museum piece that it someday will be.

Conspicuously absent from O'Neill's expedition is Ted Parker. Later in his narrative, Stap tells us how he first met Parker in Baton Rouge in 1984, then joined him in Peru on another expedition. Parker has "grown soft," says one colleague, because he no longer collects birds. Instead, he studies the behavior and ecology of living tropical communities. His superb ear and memory for tropical bird sounds are unmatched.

Stap's insights into the personalities of these two tropical pioneers are especially intriguing. At age 10, Parker brought a ruler, pen, and stack of index cards on a fishing trip so he could properly record data on each fish. O'Neill painted bird portraits as a child, and an adult once asked him why he wasn't doing something more important. The youngster responded by painting a *better* bird. O'Neill is now an outstanding bird artist.

Woven throughout Stap's narrative is much history and biology. We learn of the heyday of bird discovery in Peru — 230 new bird species described between 1830 and 1900 — and we explore the history and essence of systematics, the science of classifying organisms. Stap explains the procedure scientists must follow to describe a new species, if they are lucky enough to discover one. He shows us the large, stable mixed-species flocks in tropical forests, points out the remarkable medicinal value of tropical plants, and much, much more.

Stap skillfully weaves emotion, history, biology, personalities, and striking visual images of tropical exploration into a delightful narrative. One result of my own research may be the description of a new wren species, so I could especially empathize with the hope that yet another new species of bird would be discovered. Reading along, I felt the weariness, the anger, the hunger, and also the elation of the expedition members. And I saw the birds: the cotingas, the toucans, the antbirds, the falcons, the eagles, and the . . . Oh! Did that one have a name?

— Donald E. Kroodsma

A Parrot Without a Name by Don Stap. (New York: Alfred A. Knopf, 1990.) 239 pages.

get close enough to see what they are, they stop singing and disappear." With a recorder, Parker could tape a bird's song and then play it back to lure him into the open again.

This use of recordings, which most birdwatchers are familiar with, has more serious applications than just adding another bird to one's life list. A couple of days later Parker gave me a perfect illustration. The Rio Napo, a great, wide river that feeds the Amazon, is dotted with islands that have formed within the last 50 to 100 years. The forests on the islands are much younger than those on the nearby mainland. The trees are not as tall and the undergrowth is not very dense, but many of the same birds live in both the mainland and river island forests. Parker wanted to determine how the different habitats affect the size of a bird's territory. So off we went one morning to have a look at the birds on one of the Napo's many islands.

Walking slowly along a new trail, listening for birds, Parker worked the tape recorder like a musical instrument. If he did not have a particular bird's song already on tape, he would record its vocalization, then play it back, letting out the song as if he were casting a fishing line. The bird would hop out of a thicket, agitated and alert, jerking its head around in search of its rival. When the taped song ended, Parker would reel it back in, then let it out again. The bird would fly to a new branch to try another angle on this mystery. After a few more minutes of this teasing, the bird would eventually fly back into hiding. The points at which the bird first and last responded to the tape as Parker walked along marked the general size of its territory. In this way we walked from one threshold to another, from ash-breasted antbird to yellow-rumped cacique, from swallow-winged puffbird to silver-beaked tanager.

DON STAP

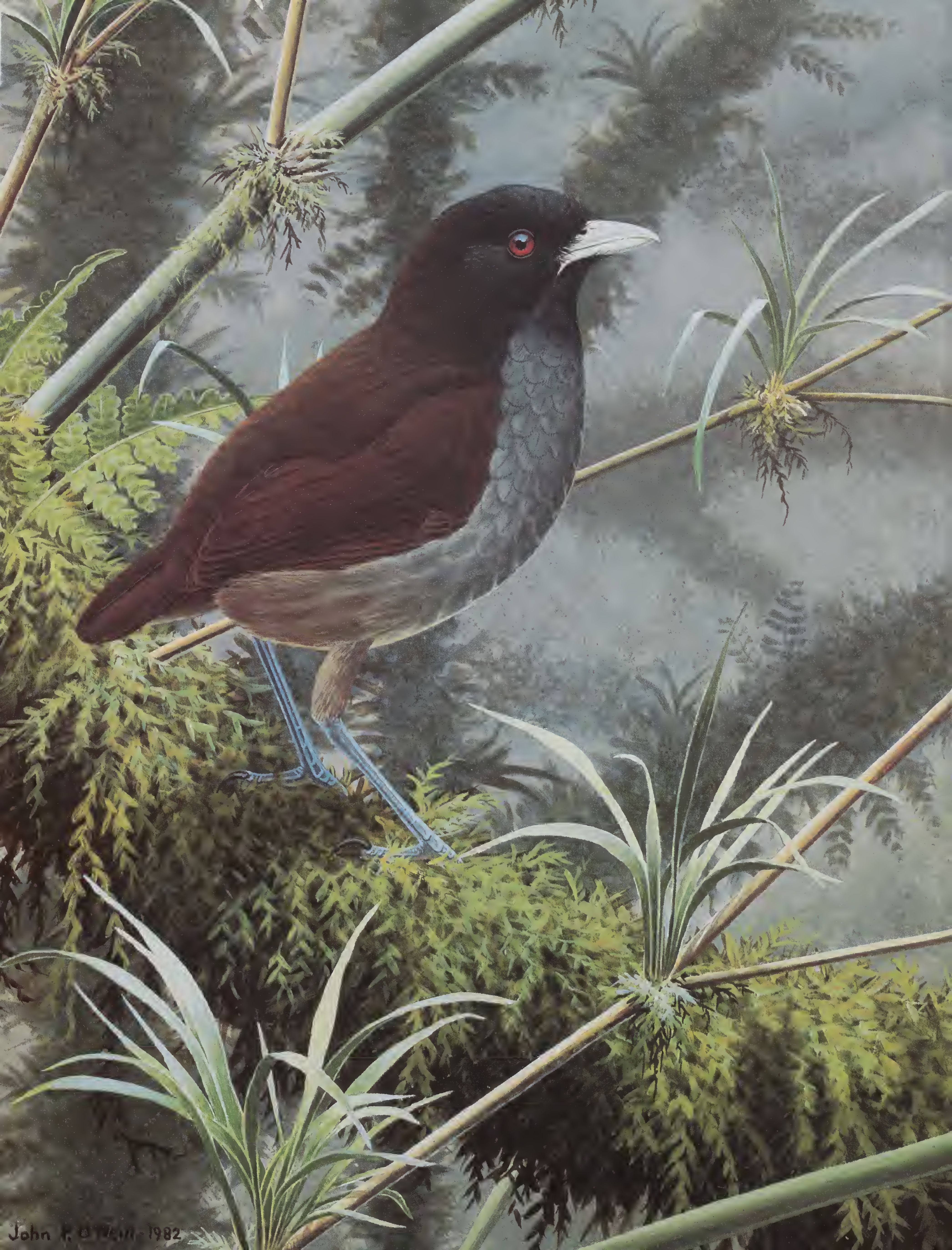
ALLAN MORGAN

Ornithologist Ted Parker (below) points his parabola to record bird sounds in Peru. The recordings will be a useful tool for scientists who study tropical birds. Forest-dwellers like this yellow-rumped cacique (left) are hard to see in dense foliage, but pop out of hiding when they hear a familiar vocalization.

Ornithologists working in the neotropics use tape-recorded bird vocalizations in a great many studies such as this. It's helpful of course if the necessary bird songs are already available on high quality recordings that an ornithologist can take into the field. Over the years, Parker, whose specialty is neotropical bird vocalizations, has made 15,000 individual recordings, which he has donated to the Library of Natural Sounds at the Cornell Laboratory of Ornithology. (Of the 5,000 species of birds represented by recordings at Cornell, nearly 2,000 are Parker's.) Copies of these recordings are available to other ornithologists on request. Cornell's sound library is the premier collection of its kind in the world, the result of thousands of hours of field work by ornithologists such as Parker.

Parker, 38 years old, has spent much of his adult life in South America, carrying the heavy Nagra recorder over one shoulder on a well-padded strap. At a study site he will get up before dawn, forgo breakfast, and head off into the jungle. He is especially alert to birds he has not yet gotten a good recording of, and for them I have seen him stand motionless in the middle of a 6-foot wide column of army ants or stop abruptly, raise his hand to demand stillness and silence from companions, then step off the trail and disappear into the forest, oblivious to all but the bird he is pursuing. He may return in five minutes or be gone an hour or two. That he has gotten lost only a few times over the years is remarkable.

In this way, Parker and other ornithologists like him have collected the vocalizations of most of the world's birds. "In a lot of ways a tape recording is just like a specimen," says Parker. "One of the main values of the collections at Cornell and elsewhere is in terms of conservation. If you want to go into an area and do a census, you have to have recordings to study


John P. O'Neill 1982

beforehand and also to use when you get to the area. Cornell puts the data about the recordings into a computer so you can, for instance, pull out all the antpittas from cloudforests in Peru. With tapes you can lure the birds out, and in many cases you can find birds in just a few hours or days that it would take months to find otherwise."

The diversity of bird species in the neotropics presents a basic problem for ornithologists. In 1978, Louisiana State University ornithologist Morris Williams, working on the eastern slope of the Andes in northern Peru, collected a specimen of a bird that initially he took to be a chestnut-naped antpitta. That species, however, had never before been found south of the Rio Maranon valley, and the bird Williams collected showed several subtle differences in plumage from other specimens of the antpitta. Perhaps this bird was a new, previously undescribed species?

Biochemical analyses would help, but as Parker has explained, "some species are weakly differentiated biochemically and yet they are reproductively isolated. Vocalizations can be even more important than biochemical analysis. If you can do experiments to see if the birds recognize individuals of their own species from other localities, this is a very important factor." Parker eventually recorded the song of the "new" antpitta and later played tapes of this song to a population of chestnut-naped antpittas north of the Rio Maranon. The birds did not respond. But when he played tapes of other chestnut-naped antpittas, the Rio Maranon birds hopped out into the open and began singing back. This experiment, along with sonograms that showed the two songs to be distinctly different, was a key factor in the decision to describe the new antpitta as a distinct species, the pale-billed antpitta.

Antpittas are difficult birds to observe because they spend much of their time foraging quietly in the undergrowth. To write a detailed natural history of one bird would require a great many hours of observation throughout the year (something that has been done with very few birds of the neotropics). To locate the bird each day, a recording, of course, would be extremely helpful. Some birds, in fact, have hardly been observed at all, and any sighting adds a little to what is known of them.

On the afternoon I accompanied Parker on his river island census, we continued walking toward the other end of the island after he had finished surveying the predetermined area. As we passed through a marshy area, Parker stopped in midstride. "Black-banded crakes!" he said excitedly. "Only four or five people have ever seen this bird!"

Parker immediately turned the tape recorder on, then pointed the shock-mounted microphone in the direction of the crakes. A crake called once, and Parker quickly rewound the tape and played the call back. A moment later the bird called again, and it seemed closer, maybe 100 feet off the trail.

"Okay, let's get down and stay very quiet," Parker said.

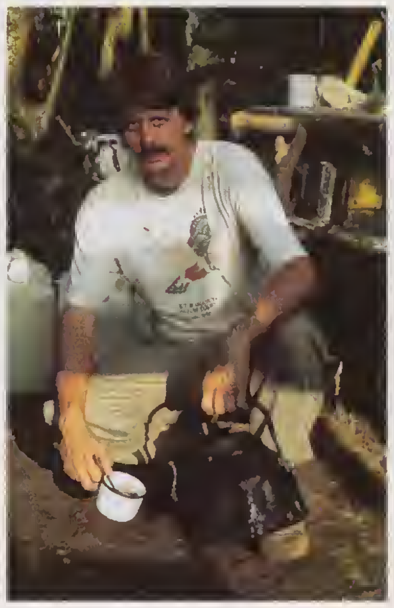
We knelt on the path, looking into the thicket of grasses and bamboo. Within 10 minutes the crakes had approached to within 30 feet. Parker pointed to a movement in the bamboo. Three or four minutes later, as Parker continued replaying the crake's call, the birds were less than 15 feet off the trail and still moving forward. Parker's face was bursting with excitement. Then the crakes emerged onto the trail less than 10 feet from us. Both birds kept walking, startled by our presence and mystified by the phantom call they had responded to. They walked nervously but unhurriedly across the opening, giving us a clear view of them before they disappeared again in the dense grasses.

Parker let out a big breath and a high-pitched laugh of delight. We stood up and shook off the cloud of mosquitoes that had settled on us.

"Incredible," Parker said. "That was incredible." We had gotten a great look at the crakes, an image that I still carry with me, in sharp contrast to the blurred picture of the squirrel cuckoo that I always find frozen in the disarray of flight, half in and half out of my memory.

Vast areas of South America are yet to be explored, and the pressure to survey the flora and fauna of these areas increases as more and more rainforest is destroyed each year. We can argue that we should preserve the rainforest for its beauty and wonder, or because all living things have the inherent right to survive. We might say that tropical rainforests hold many of the keys to our understanding of evolution, or we might appeal to human self-interest: one-fourth of all prescription drugs are directly or indirectly derived from rainforest plants. But whatever approach we take, the argument to save rainforests hinges on knowing what is there and on illustrating the great diversity of plant and animal life present. It is easy for "save-the-rainforest" activists to take this for granted, but those on the other side of the issue demand proof, which means accurate, scientific surveys of plant and animal populations. Birds, as an indicator of species richness, are a good place to start. And when it comes to birds, direct observation—still the primary tenet of the scientific method—often involves a keen ear and a tape recorder, two basic tools of neotropical ornithology. ☐

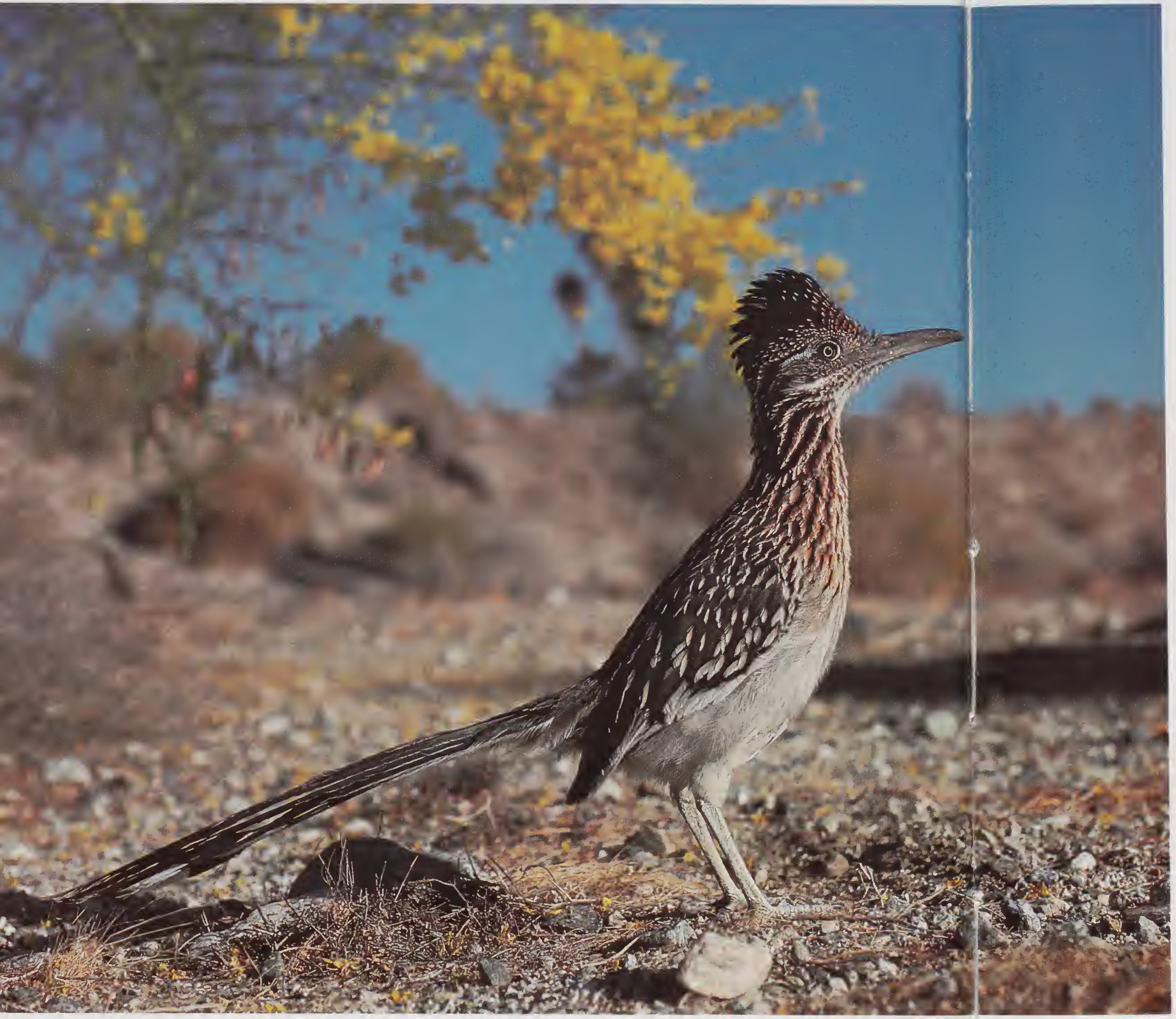
Recorded sounds can be used not just to count birds but for other types of research as well. Parker used tape-recorded bird sounds to show that an odd-looking antpitta was really a distinct new species. The discovery of the pale-billed antpitta is celebrated in this portrait by ornithologist-artist John P. O'Neill (left). Below, author Don Stap at the riverside camp in Peru.



JOHN P. O'NEILL

Detail of mixed-media painting by John P. O'Neill

Much of the information in this article is drawn from *A Parrot Without a Name,* Don Stap's account of his travels in Peru with ornithologists Ted Parker and John O'Neill. The book, now in its second printing, is reviewed in the accompanying sidebar. Stap is also the author of a book of poetry, *Letter at the End of Winter,* and has written for *International Wildlife* and *Sierra.* He teaches at the University of Central Florida in Orlando.



Cactus Cuckoo

Photographs by Jeff Foott

On the road with the paisano of the western range

Think fast! What looks like an old brown feather duster and goes from zero to 20 miles per hour in 3.2 seconds flat without leaving the ground? Stumped? I'll give you a hint — it has its own cartoon show. It's also the State Bird of New Mexico. That's right, it's the roadrunner.

Called *paisano* (fellow countryman) by Spanish-speaking residents of the United States/Mexico border country, the greater roadrunner is a popular symbol of the arid Southwest. Anyone taking a drive along the roads and byways of the area can usually spot one of these unique birds quite easily, perched on a cactus, shrub, or rock soaking up sunlight, or dashing frantically from place to place in search of prey.

The greater roadrunner is a member of the cuckoo family, but unlike some old world species, this one builds a nest and raises its own young rather than parasitizing the nests of other species. A marvel of adaptation, the roadrunner exists in the harshest of environments, where temperatures often drop to near freezing at night, only to become sizzling hot a few hours later under the parching midday sun of the desert.

Roadrunners have a normal body temperature of 101 degrees Fahrenheit, but they can lower it as much as 7 degrees to conserve energy during the frigid desert night. Incubating birds, however, maintain their normal temperature at night to keep their eggs sufficiently warm. In the morning, roadrunners usually perch in the open to bask in the sun. The birds fluff up their back feathers to reveal another unique adaptation — dark feathers that act as a solar panel, effectively gathering the warming rays of sunlight.

But the most distinctive thing about the roadrunner would have to be its appearance. J. L. Sloanaker, writing in 1913, perhaps described the bird best: "Try and think of a long striped snake on two legs, a feather duster on his head and another trailing behind; or a tall, slim tramp in a swallow-tailed coat, a black and blue eye, and a head of hair standing straight on end! There you are!"

The roadrunner's snakey body is perfect for its hunting style — cruising swiftly along on trails or through sparse vegetation, opportunistically pouncing on whatever small rodent, reptile, insect, or bird pops up in its path. Its long legs and slender body enable it to run swiftly; its long tail acts as a rudder and keeps the bird balanced when making a sharp turn.

Roadrunners are also known for their daring; many people have seen them attack and kill rattlesnakes and other potentially dangerous adversaries. When attacking a rattlesnake, a roadrunner usually circles around the snake, deftly side-stepping or jumping up when the snake strikes, avoiding the snake's fangs as adroitly as a matador evades a bull's horns. Whenever an opportunity arises during the combat, the roadrunner pecks at the back of the rattlesnake's head until the snake is finally disabled and then killed.

Jeff Foott, who took all the pictures in this feature, spent two winters photographing the birds in the Mojave and Sonora deserts. Though he went there to photograph desert wildlife in general, the antics of the roadrunners he encountered drew his attention again and again. We hope you'll enjoy this portrait gallery of a Southwestern favorite. — T.G.

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Sleek and agile, roadrunners are highly effective predators. They travel swiftly along trails or through sparse cover while foraging, pouncing on whatever small prey they happen to find. Though roadrunners do consume some seeds and fruit, they are primarily predators. Opportunistic hunters, they feed on a wide variety of prey, from tiny insects to mice, lizards, snakes, and small birds.

All fluffed up, a roadrunner exposes dark-colored feathers on its back (above). Because dark colors absorb heat effectively, this unique adaptation allows the bird to make the most of the first warming rays from the morning sun.

A male roadrunner offers his mate a treat before copulating with her (above right). This prickly stand of cactus makes an ideal nesting place for the "cactus cuckoo" (center right). At bottom, the end result. Unlike some old world cuckoos, the roadrunner raises its own young, rather than laying its eggs in another bird's nest.

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From Bird Song to the Philosophy of Life

Nathaniel Comfort

Fernando Nottebohm ventures into the brain on his serendipitous route to discovery

> *"You must not know too much, or be too scientific about birds . . . . A certain free margin, and even vagueness — perhaps ignorance — helps your enjoyment."*
>
> — *Walt Whitman*

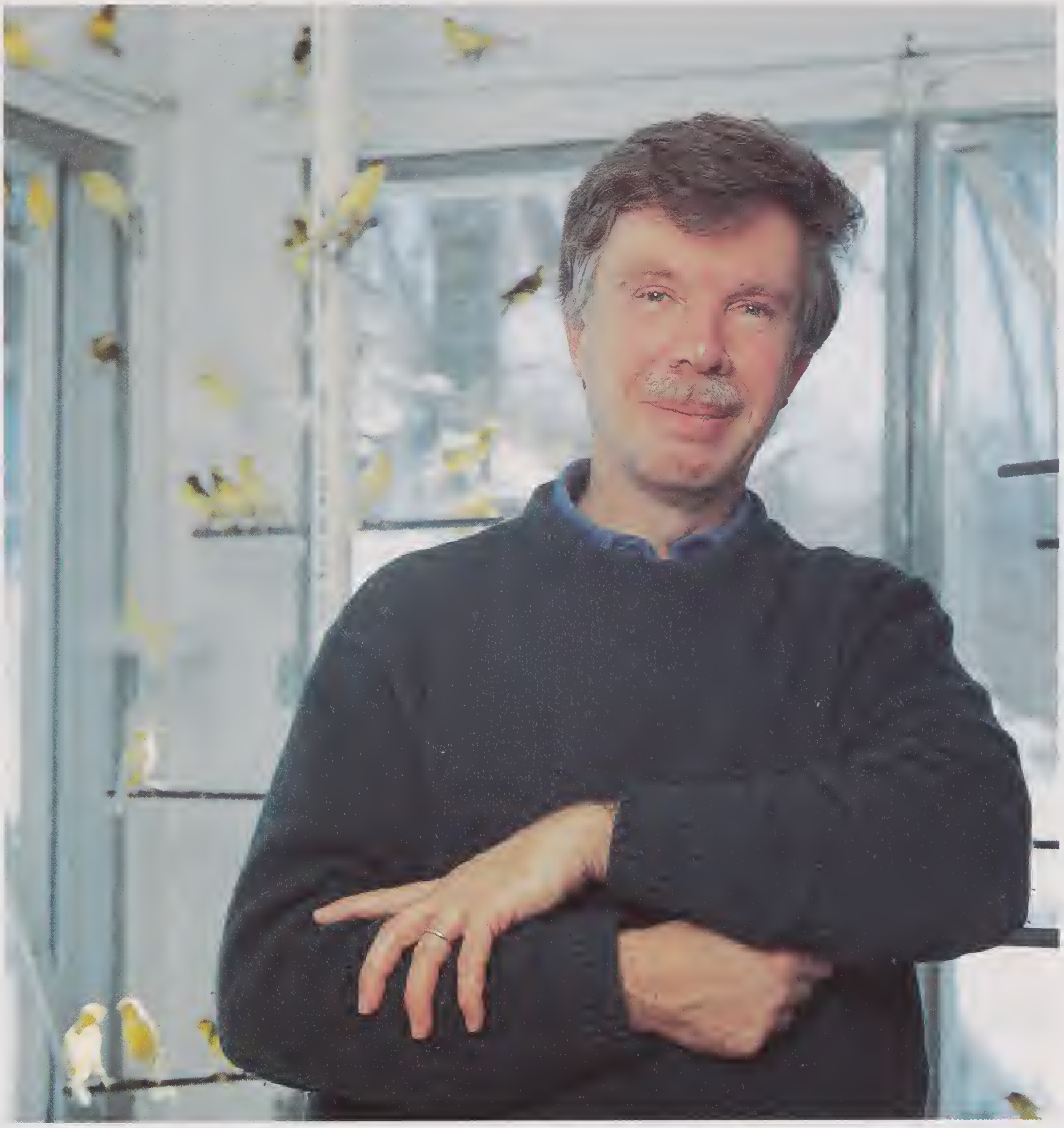
As I walk through the woods of Upstate New York, the hills themselves seem to be singing. I hear many more birds than I see: cardinals, sparrows, thrushes, and catbirds call from distant perches. Males stake out territories with their songs, trying to lure choosy females into mating. A female bird must first pick out of the cacophony the songs of her own species, and then, using some ancient algorithm, choose a partner based on the quality of his call. To my ears, the chickadee's song is more trance-inducing than sexy — a monotonous *Fee-bee. Fee-bee*. But I notice that the wood thrush varies his song with nearly every repetition. Even as I listen, I begin to wonder why some birds' songs are so variable while other birds' songs are not. And why does only the male sing? Perhaps the female is physically unable to produce the sounds, the way I am unable to sing a double high C. Or maybe her brain lacks some subtle circuitry that the male has, that allows him to pour forth his splendid song while she is restricted to a few chirps and peeps.

As a child in his native Argentina, Fernando Nottebohm also loved to walk and listen to birds. He learned the local birds by song, and he developed a keen ear and a good memory for trills, warbles, and chirps. "Song is the ubiquitous smile," he told me recently — the immediately attractive feature of birds. For a young man with a love of birds and a passion for intellectual challenges, the scientific study of birdsong was a natural career choice. In interviews, Nottebohm, now a scientist at the Rockefeller University Field Station in Millbrook, New York, is a charming spokesman. He speaks with a polished Argentinian accent, and easily waxes eloquent about his research. It allows him, he told me, to "go from birdsong to the philosophy of life."

In the laboratory and the seminar room, however, Professor Nottebohm is driven by an intellectual ardor that produces great results — and can sometimes alienate his colleagues. His inquisitiveness has taken him into strange intellectual territory. He has ventured into the brain areas involved in learning and producing song, and even into the molecules within the brain cells. Often his journey has been serendipitous. By taking risks, by suggesting the unlikely, Nottebohm has given us insight into how birds sing. He has overturned entrenched dogmas of brain function. And his research may eventually lead to a way for a damaged human brain to repair itself.

The scientific analysis of the structure of bird song began with W. H. Thorpe in the 1950s. He attached a device called a spectrograph to a tape recorder and produced visual images, or spectrograms, of bird songs, plotted as frequency versus time. Out of the spectrograms' waves and smears leaped details that the ear could not discern. The spectrograph allowed songs to be analyzed and classified in much greater detail than was previously possible. Thorpe also identified the critical period for song learning in the chaffinch. Just as ducklings will learn to follow whatever they see moving soon after they hatch, young chaffinches will imprint on whatever songs they hear during this critical period.

In the 1960s, a student of Thorpe's named Peter Marler further advanced this budding field of research by quantifying three discrete stages in song development in young white-crowned sparrows. "Subsong" is a soft warbling, often performed when a chick is resting. It is reminiscent of the babbling of human babies, and is thought to serve a similar function — a sort of practice, or vocal exercise. Subsong develops into "plastic song," in which syllables of the adult song begin to appear. Over the next few weeks plastic song "crystallizes" into the full adult song. In some species this process happens only once: like Thorpe's chaffinch, the white-crowned sparrow is a critical period learner. Once the critical period is passed, the bird's song is fixed, and does not change for the rest of its life. Other species, such as the canary, are "open-ended"



KIMBERLY BUTLER

Fernando Nottebohm's research on neurogenesis in adult canaries may lead eventually to new medical treatments for humans.

learners. Each year after the breeding season, the male canary's crystallized song reverts to plastic song. When song recrystallizes the following winter, the bird has dropped some syllables from its repertoire and added new ones.

In young Fernando Nottebohm's eyes, Peter Marler was living in the intellectual lap of luxury; he was able to make a living out of studying birdsong. The prospect of combining his childhood love of birds with an intellectual challenge — and of making a living at it — brought Nottebohm to study birdsong with Marler at the University of California at Berkeley. His first work as a graduate student in the 1960s was to examine the basis of the regularity, or stereotypy, in the male chaffinch's song syllables. Though the chaffinch has a seemingly endless variety of songs, it forms them by combining the same syllables in different ways. It is this regularity that allows us — and presumably a female chaffinch — to distinguish one male's song from another's. Nottebohm cut one or both of the paired nerves to the syrinx — the organ that produces song — to see if male chaffinches suffered a loss of stereotypy. To his surprise, he found a much greater loss in certain components of the song when he cut the left nerve than when he cut the right.

This serendipitous discovery suggested to him that birds might show laterality. Researchers had long known of laterality, or "sidedness," in the human brain. The left side of our brain controls language, and right-handers are said to be "left-brain dominant." Perhaps, it was thought, right-handers were naturally more logical and articulate than left-handers. Conversely, lefties are said to be "right-brain dominant," and seem to be more intuitive and creative. (These findings have been misused and over-interpreted, leading to prejudices of aptitude that southpaws like myself counter with statements like, "Lefties are the only people in their right minds.") Although no one knew exactly what these connections meant, laterality was an exciting discovery, because previously researchers had thought that the brain was perfectly symmetrical.

No one had ever shown laterality in nonhumans. The thrilled graduate student wondered if the left side of the avian brain controls birds' "speech." "It was the kind of bumbling discovery that you make when you are working alone on your dissertation," Nottebohm told me, the sort of thing that "you would never see if you had a whole lab full of students and technicians doing your work for you." The laterality result is still controversial (as it is in human speech). Nevertheless, it sparked Nottebohm's interest in the neural basis of birdsong.

ROBERT VILLANI

A male common yellowthroat sings from his perch on a marsh reed. For Nottebohm, bird song is the "ubiquitous smile," the immediately attractive feature of birds.

In order to find the brain areas responsible for song, Nottebohm found that he needed to learn neuroanatomy. He identified the clusters of neurons, or brain nuclei, that are responsible for producing song. He christened these nuclei with unpronounceable Latin names describing their position in the brain. Two of the most interesting were the nucleus Robustus Archistriatum, or RA, and nucleus Hyperstriatum Ventrale, pars Caudalis, or HVC. HVC, however, later turned out not to be a part of the brain region called the hyperstriatum at all. But "HVC" was by then firmly established in the scientific literature, so rather than give it a new anatomical name, Nottebohm formally adopted the nickname given to it by birdsong researchers: the High Vocal Center.

In the mid-1970s, Nottebohm and graduate student Art Arnold compared the size of the song control nuclei in breeding-condition male and female canaries. In immature and nonbreeding birds, the song control nuclei in males and females are identical. Nottebohm and Arnold found, however, that in breeding birds HVC and RA were larger in males than in females. They didn't yet know whether the size differences were the result of males' neurons being larger or simply farther apart. The cells couldn't be more numerous — adult animals can't make new brain cells — or could they? Whatever it was, there was a nice correlation between nucleus size and behavior: the singing birds had the larger brain nuclei. Furthermore, the differences they saw in HVC were greater than those in RA. Just a few years earlier, scientists had thought that male and female brains never differed. Nottebohm and Arnold's work helped change the way we think about learning and behavior.

But these sex differences were not static — they seemed to change over the breeding cycle. In 1981 Nottebohm published a landmark paper in the journal *Science* entitled "A Brain For All Seasons," in which he reported that in the fall, when males aren't singing, there was no difference between male and female brains. Male HVC and RA seemed to grow as the birds came into breeding condition in the spring. When HVC and RA were expanding, the bird was adding syllables to its repertoire and the song was crystallizing. The nuclei remained stable during the summer when the song was constant, and they began to shrink just when the bird reverted to plastic song, its song syllables degenerating and its repertoire diminishing. This result sparked 10 years of controversy and launched many academic careers. It also turned out to be wrong.

Recent results from other laboratories have challenged or revised Nottebohm's simple, elegant model of seasonal changes in songbird brain anatomy. One revision to Nottebohm's theory has come via one of the dullest types of scientific research—the study of the techniques of science themselves. Nottebohm's primary technique, the hammer in his toolbox, was histology, the study of tissue. In order to look at the size, shape, and connections of neurons, it is necessary to slice nerve tissue very thin, and stain it so that the cells become visible. Nottebohm used a common stain called Nissl stain. But in 1990, Manfred Gahr, a neurobiologist now at the University of Texas at Austin, compared the size of HVC in breeding and non-breeding canaries using different staining techniques. Gahr found that using Nissl stain, HVC indeed appeared to grow and shrink over the year. But using two other stains, he found that the volume of HVC remained constant throughout the year.

It appears, then, that HVC does not really grow and shrink. The nucleus remains a constant size year round, but some of its cells do not pick up Nissl stain in the fall and winter. Nissl stain sticks to the metabolic machinery of the cell; the neurons probably stop staining for Nissl because they are less metabolically active. A reduction in the number of active cells may therefore be the real change that occurs when the bird reverts to plastic song in the fall. All of the cells are there, but some of them seem to "shut down" after the breeding season.

Another report, still in press, by Eliot Brenowitz of the University of Washington in Seattle, throws another wrench in the works. Brenowitz looked at the size of HVC and RA in the rufous-sided towhee. He found seasonal changes in towhee HVC and RA similar to those Nottebohm found in the canary. Yet the towhee is a once-in-a-lifetime, critical-period learner. So seasonal changes in brain nuclei are not necessarily correlated with seasonal changes in song repertoire.

A biology teacher once told me that a mark of good science is that it raises more questions than it answers; if so, then this is certainly good science. What do the seasonal changes in the brain mean? How do they relate to what the bird actually sings? What do HVC and RA do? No one yet knows, although Nottebohm has some ideas.

Nucleus HVC seems to be a link between the bird's hearing and its song production. It processes incoming sound — including the bird's own song — and passes it on to the rest of the song control system. Thorpe and Marler showed that what a bird hears influences what it sings; Nottebohm suggests that part of this "influence" occurs in HVC. If HVC is involved with listening as well as singing, changes in HVC may be necessary not only for male canaries, but also for female canaries and critical period learners such as towhees. All birds listen, whether or not their song changes, or even if they don't sing at all. They all may therefore need to engage more of their brains in listening in the spring, when males start to sing.

The High Vocal Center connects with RA not once but twice; by a direct path and by an indirect path. Some RA cells receive signals from both pathways, and then connect to the cells that control the syrinx. Nottebohm thinks that if there is a place in the brain where a "motor program" for song — a set of instructions to produce each bird's unique song — resides, it may be in RA. Perhaps a bird's RA compares its two messages from HVC, and uses the sounds the bird hears to shape the sounds it produces. Talking to Nottebohm and reading the scientific literature, one gets the feeling that the puzzle is about to be solved, but a few key pieces are still missing.

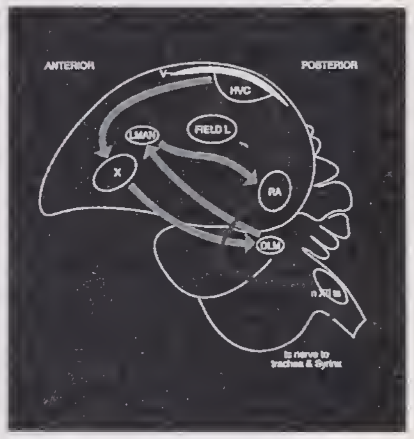
Nottebohm is known for his forceful style of research and intellectual debate — a reputation he shares with his "academic father," Peter Marler. He and Marler are famous among Rockefeller alumni for their highly vocal arguments — some directed at each other, others at graduate students. Doubtless some disgruntled bird song researchers set out to disprove Nottebohm's hypothesis. I know more than one who, embarrassed by Nottebohm's criticism in seminars, expressed private glee when his simple, elegant hypothesis was punctured. Nevertheless, Nottebohm is sanguine about his misinterpretation. It led to the most important discovery of his career.

In the 60-or-so years of neuroscience before Nottebohm, generations of students were taught that, unlike other cells, neurons cannot regenerate. When you cut your finger, you take it for granted that the skin and muscle will grow back. New cells are "born" to take the place of those that were lost. If nerve cells are destroyed, however, the loss is permanent. Students were taught that neurogenesis, the birth of neurons, occurs only in fetuses and newborns. Yet when Nottebohm thought that the brain nuclei HVC and RA were growing in adult, breeding condition males, he dared to ask if it was because new cells were being added. He told me that a professional embryologist would never have suggested neurogenesis was responsible for the sex differences he observed. An embryologist would have been laughed out of the field. "But I could afford to make mistakes," Nottebohm said, "because I was reasonably ignorant and not an expert in the field. I was not worried about looking ridiculous."

Working under what he now believes was the illusion of seasonally growing and shrinking brain nuclei, Nottebohm began to study the possibility of neurogenesis in the adult avian brain. With a series of graduate students, postdoctoral students, and other colleagues, he has clearly demonstrated that adult neurogenesis does occur. Nottebohm and Steven Goldman showed that brain cells are born in adult canaries. With John Paton, Nottebohm showed that these new cells are neurons, rather than non-neural nutritive brain cells, and that they are incorporated into functional brain circuits. Although other scientists have demonstrated the birth of new brain cells in adult animals, no one else has shown that the new cells become functional neurons. With Arturo Alvarez-Buylla and John Kirn, Nottebohm showed that the newly born neurons may be related to song learning. "Thus," Nottebohm says, "an error of interpretation led me to consider what I believe was the most important finding to come out of my laboratory — neurogenesis and neuronal replacement in an adult brain." Serendipity again.

Since neurogenesis is a part of normal development for young animals, it seems clear that at some point during development a molecular switch is thrown that tells the brain, "You're an adult now; no more neurons." In at least some birds, however, that switch appears not to be thrown; they continue to generate neurons throughout adulthood. Nottebohm is now trying to find that molecular switch in the bird's genes. If he can find it in a bird, we might be able to find it in humans, and flip it back to its infant state. This would be a profound finding for victims of brain damage caused by injury or disease. Although the path from the bird brain to the human brain is Himalayan in proportions, Nottebohm hopes that his research, which began with a fascination for bird song, will lead to a medical technique for repairing a damaged brain.

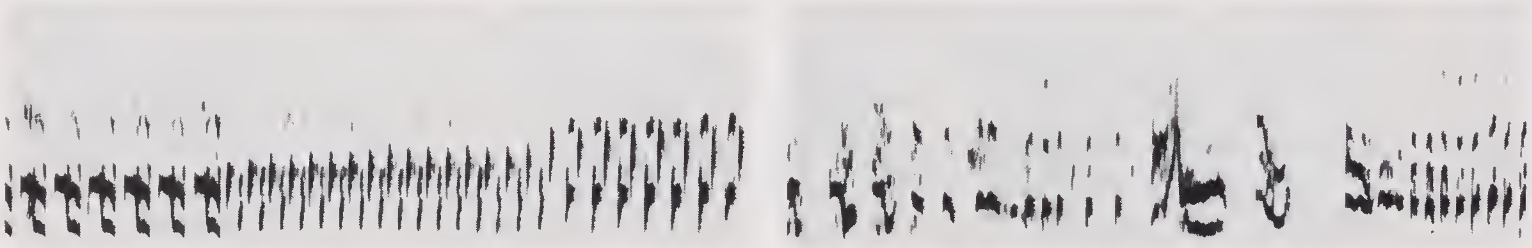
Brain repair is a long way from Argentinian birds. By following his heart and mind, Nottebohm seems to have stumbled onto some of the most important discoveries in modern neuroscience. He is still an avid birder, he says. I asked him if the myopia of the microscope clouded his enjoyment of the natural world, if he thinks about brain circuits and molecules when he walks through the woods on a spring day. "I can still enjoy birding for its own sake," he replied. "Usually I'm just enjoying the beauty of it all." □



Courtesy Fernando Nottebohm

This diagram, a section through the brain area controlling song in an adult canary, shows two pathways for song production. The main motor pathway for the production of learned song (dark gray arrows) goes from HVC to RA to the syrinx. Another pathway (light gray arrows) is the long way to go from HVC to RA.

Below, two sound-spectrograms show how the song of a male canary changes over the course of a year. During the breeding season (left), the song is stable; afterwards, the bird reverts to plastic song with its wavering and irregular syllables (right).



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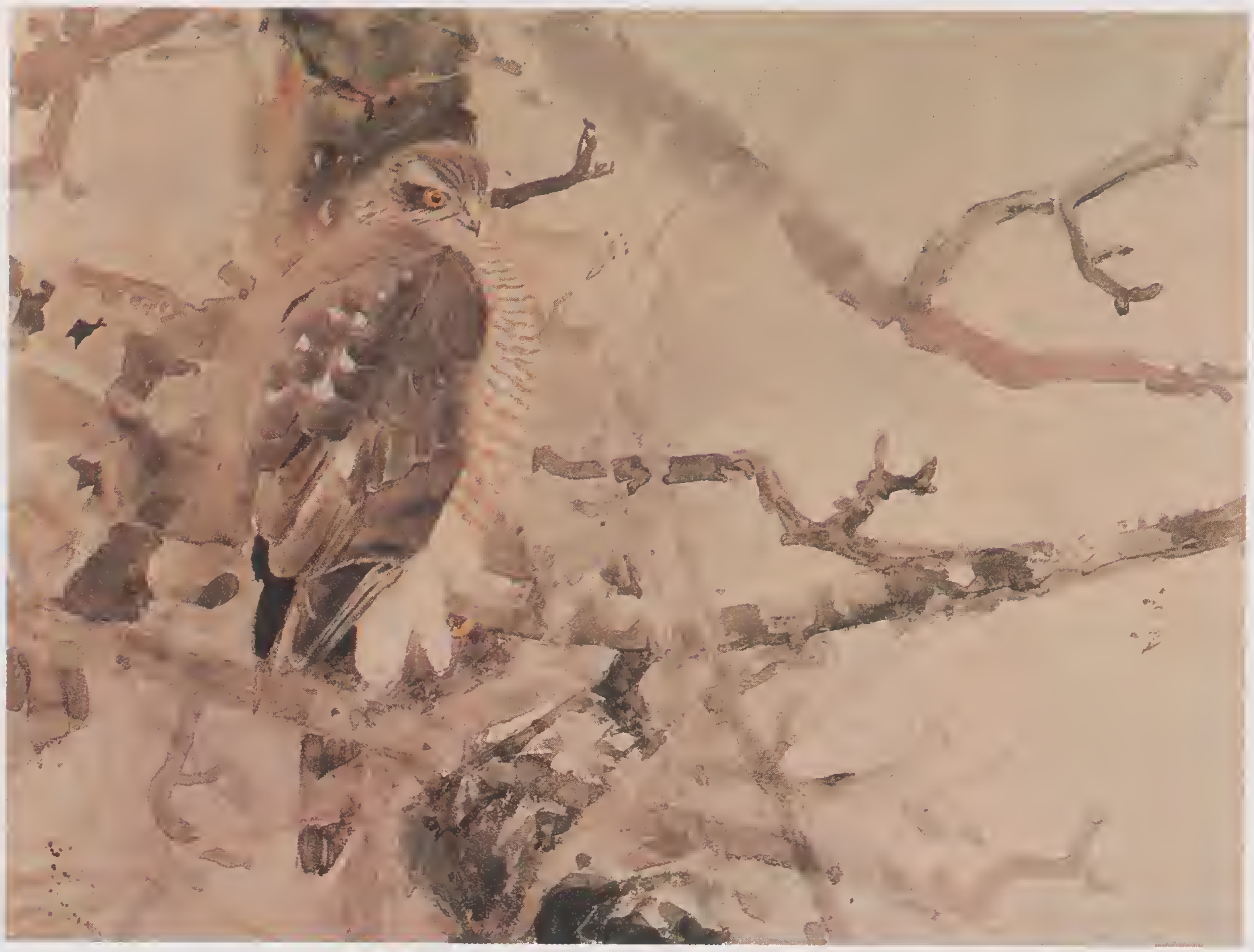

Painting by Lars Jonsson from *Birds in Art*

Artist Lars Jonsson painted this evocative portrait of a sparrowhawk while viewing the bird through a telescope.

Birds in Art: The Masters **by Inga Brynildson and Woody Hagge (Wausau: Leigh Yawkey Woodson Art Museum, 1990.) 128 pages. $24.95 (cloth).**

In the summer of 1978, when I was a new staff member at the Bell Museum of Natural History in Minneapolis, I met a distinguished older couple from a museum I had never heard of in a little town in the middle of Wisconsin. Alice and John Forrester had come to borrow a selection of paintings by Francis Lee Jaques for the "Birds In Art" exhibition at the Leigh Yawkey Woodson Art Museum in Wausau.

The first "Birds in Art" show had coincided with the opening of the Woodson Museum two years earlier. Artist Owen Gromme organized that exhibition by calling "a few friends" to send their works of art. Twenty-three artists responded with 70 paintings and sculptures. The show was so well received that the museum made it an annual event. Since then I, and millions of other people, have come to admire the quality of this annual exhibition of contemporary art depicting birds, and the show has grown into the premier exhibition of contemporary wildlife art in the world.

The high point of each "Birds in Art" opening is the presentation of the Master Wildlife Artist Award, given to someone who has made "outstanding contributions as a naturalist and conservationist, and who has created important bird art." The Woodson Museum celebrated the fifteenth anniversary of their bird art exhibition this past September by publishing an impressive book featuring the work of the first 14 artists who were honored with this prestigious award: Owen J. Gromme, George Miksch Sutton, Roger Tory Peterson, Don Richard Eckelberry, Peter Scott, Arthur B. Singer, Robert Bateman, Guy Coheleach, Charles Greenough Chase, J. Fenwick Lansdowne, Keith Shackleton, Kent Ullberg, Lars Jonsson, and Maynard Reece.

Titled *Birds in Art: The Masters*, the book includes a history of the Woodson Museum and the "Birds in Art" exhibition, as well as a concise history of bird art from prehistoric caves to 20th-century galleries. The heart of the book is a selection of excellent reproductions from each artist, accompanied with text derived largely from the artists' presentations at the annual awards ceremony. The format works well and is probably the best representation in print of the kind of sharing of ideas and inspiration that has made the "Birds in Art" opening such a valuable event.

The "Birds in Art" exhibition holds the rare distinction among wildlife art shows of being displayed in a major fine arts museum. In 1980, the Smithsonian Institution's Museum of American Art featured selections from the 1979 exhibition. "Birds in Art" has even gained the attention of a few art critics from the academic world. Art history professor Robert Silberman used the annual show as the focus for his lively and thoughtful critique of wildlife art published in the journal *Smithsonian Studies in American Art* (Spring 1989).

"Birds in Art" has not only changed the profile of wildlife art in the community at large, it has also raised the quality of work among wildlife artists. The juried exhibition has opened the door to many talented young artists and provided a forum where wildlife artists can feel comfortable swapping pointers on technique and even delving into the meaning of their art. For many wildlife artists and their admirers, the September opening of "Birds in Art" has become a critical stopover on their fall migrations.

The concerns expressed by the artists featured in *Birds in*

Art: The Masters vary widely. Don Eckelberry ponders the meaning of art: "I do not believe that art has anything to do with visual appearances. It is not what is seen, but what is felt in what is seen that counts; in other words, not sight but insight." Charles "Chippy" Chase, on the other hand, launches right into the nitty-gritty techniques he uses to cut, chisel, and polish solid blocks of wood into elegant avian forms: "To get a shiny look, like the shimmery effect of water, I take something really hard and mash down the grain."

Despite their differences, several themes appear again and again in the artists' words. The first is why they paint wildlife. Owen Gromme answers most simply: "I love to paint and I am fascinated by the beauty of nature." Lars Jonsson is attracted to birds by what he sees as their "spirituality, the way they lift from the earth and seem to fly weightlessly — something humans always dream of doing."

Many artists joined George Miksch Sutton in asking, "Is bird art really art? Can it be that we who long so desperately to capture some of the beauty we have seen, and that we want others to enjoy, are not artists at all?" Robert Bateman complains, "There seems to be some kind of a wall among art museum curators regarding wildlife art. They'll accept realism of a person, a motel, or a motorcycle, but they won't accept it if it's a bird or a wolf." On the other hand, Maynard Reece seems less concerned about whether his paintings are in art galleries or natural history museums. Instead, he is satisfied that so many people enjoy his work. "People like to reminisce. My paintings may remind them of some favorite place and transport them from mundane activity to a place they like to be."

But is it enough simply to express one's love for the beauty of nature? Many of the artists hope their work conveys more meaning about nature, particularly its need for protection. Roger Tory Peterson states, "True environmental ethics must be founded on true understanding of natural history — after all, that's what ties this whole thing together." For Peter Scott, "one of the greatest fascinations in nature is the way evolution has produced this diversity of species molded by the particular environment they live in. Their study leads me to look upon species extinction at the hands of unthinking man . . . as wicked irresponsibility." Bateman sums it up well: "I care about the surface of the earth — not just about the surface of my paint."

Wildlife art has both benefitted from and contributed to the rise of ecological awareness. Whether it is accepted by art critics or not, millions of Americans have found in it an expression of their own love for the natural world. *Birds in Art: The Masters* provides excellent images and insights from the best of today's practitioners. For anyone interested in wildlife art, it is an essential reference and, at $24.95, a bargain to boot. — *Donald T. Luce*

Tim Fitzharris

***The Audubon Society Guide To Nature Photography* by Tim Fitzharris. (Boston: Little, Brown & Company, 1990.) 167 pages. $29.95 (cloth).**

Tim Fitzharris's latest book is a welcome addition to the literature on nature photography. Though it has all the trappings of a coffee table book — large format and full color blowups of wildlife and natural landscapes — it is actually much more than that, for in its pages Fitzharris reveals much of the technique as well as the philosophy behind his picture taking.

The book is quite broad in scope — birds are only one subject among many that Fitzharris discusses. There are also segments on photographing wildflowers, insects, reptiles, animals, as well as natural landscapes. But bird photographers will find plenty to interest them. Fitzharris is an acknowledged master of bird photography and his work appears regularly in major bird magazines here and abroad. The book is full of great bird shots and information on how they were taken. And besides, the lessons to be learned from reading about photographing hyenas in Africa or grizzlies in Alaska are often directly applicable to photographing birds in your own area.

Fitzharris starts with the very basics — which cameras, lenses, and tripods are best; what field accessories you need; how to care for equipment; choosing the right film; determining exposure — then moves on to discuss the finer elements of photography, such as picture design, creative use of filters, and how to take advantage of the natural drama of light.

Many professional nature photographers are reluctant to tell how they got their best shots; they don't want to increase the competition from other would-be nature photographers by revealing the tricks of the trade. Fitzharris is an exception. He is quite open about discussing how he achieved certain effects in his photographs. In one two-page spread, for example, he shows two shots of a gannet in flight. In the first photograph the gannet is tack sharp, frozen in the air with every feather crisp and clear, thanks to the relatively fast $^1/_{750}$th of a second shutterspeed Fitzharris used. In the other photograph, taken at $^1/_{30}$th of second, the bird's wings are a blur, effectively showing movement.

Both photographs are beautiful, but they illustrate two very different approaches to the same goal of capturing a flying gannet on film. It is up to the individual photographer to decide what he or she wants in a picture. Fitzharris describes his own techniques for picture taking, but he doesn't say they are the only way. "The camera, like the painter's brush or the poet's pen, is a tool we can use to explore our planet," says Fitzharris. "If we can look through the lens with our eyes wide open, we may be rewarded with a picture of our own soul."

Not everyone who reads this book will be inspired to follow in Fitzharris's footsteps. To take wildlife photographs like his requires an enormous degree of commitment and a willingness to suffer great discomfort. Fitzharris is famous for his intimate portraits of waterfowl, taken up close and at eye level. To get those shots he spent countless hours chest deep in frigid water with a mobile blind covering his head. For people who want to give it a try, he provides details on building the blind and on approaching wary waterfowl. But I doubt whether many will do it. Says Fitzharris, "Most photographers get up before dawn to wade through a swamp or struggle up a mountain because they like what they see — so much that they want to express the experience through their pictures." If you don't already have the will to suffer discomfort in order to view a beautiful scene, it's a difficult quality to cultivate. But if you do have it, this book will help you to develop it as a photographic tool.

Although parts of *The Audubon Society Guide To Nature Photography* might be a rehash of things that advanced or professional photographers already know, I think there is enough useful information to interest most readers. Any aspiring photographer who has been moved by Fitzharris's stunning photographs of the natural world will appreciate this book.

— *Tim Gallagher*

LEICA 8x42 BINOCULARS

When we conducted our last extensive binocular field test ("Scanning for Optics," Autumn 1988), these new Leica binoculars were not yet on the market. Had they been available, they would certainly have placed among the top two or three contenders in the review.

One of the first things you'll notice when you pick up a pair of these binoculars is their distinctive shape and size. They are shorter, wider, and heavier than their predecessors at Leica. I like the added heft. They fill my hands nicely and the extra weight helps to steady my hands while viewing. Some people may find the new shape objectionable but, in any case, you should always go to an optical shop and handle a pair of binoculars before you buy them — particularly if they are expensive.

The new Leicas come in 7x42, 8x42, and 10x42 models, and embody the latest advances in optical technology. The one-piece, all-metal body, covered with a polyurethane shell, is sealed and nitrogen purged to keep moisture out.

The newly designed diopter adjustment is built into the focusing knob. You just snap it up, make the adjustment, then snap it down, locking it into place. It is then impossible to change the adjustment by mistake. With other binoculars, you must either turn one of the eyepieces to make a diopter adjustment or use a separate knob, neither of which is as convenient or as secure as the Leica's.

The new eyecups are another positive feature. They pop up and down easily to accommodate eyeglass wearers. This design is a great improvement over soft rubber eyecups, which tend to wear out from being folded up and down, or to rot from being exposed to perspiration. The new Leica hard rubber, pop-up eyecups look like they'll be there for years, perhaps for the life of the binoculars.

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Though we didn't drop the binoculars off the top of the Lab building to test their durability, the Leicas did face some remarkably harsh conditions. One Lab staffer who helped test the binoculars for this review fell through the ice on a pond during the Christmas Bird Count. The binoculars took the frigid dunking in stride, with no signs of water leakage or fogging. The staffer was so impressed that she bought the pair at the end of the test period.

Though we only tried the 8x42 Leicas, the three models are virtually identical. We did find one possible negative point about these binoculars — the close-focus distance, which was about 17 feet with the 8x42s. While that is adequate for most birding, at times you you may want to get closer, for example when you are looking at warblers up close in tight cover. Other brands with closer focusing capabilities are available. The price of the binoculars ($1,365) might also make people think twice before making the purchase. But if the relatively long close-focus distance is not a problem for you, and if the price doesn't sound like too much for a lifetime investment, these binoculars are certainly well worth considering.

— *Tim Gallagher*

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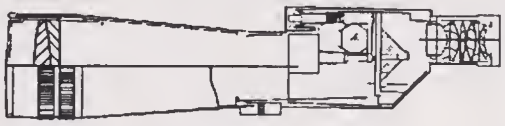

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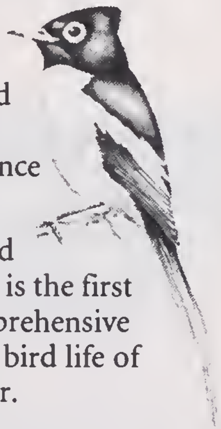

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STEVE CARVER

TIPS FOR TIN-EARS

Jack Connor

My first birding guru, John Henry Hintermister, is still the one and only expert I've ever met who is willing to speak the honest truth about birding by ear. One May morning we were walking through the woods near Cedar Key, Florida, when a bird sang from high above. John stopped in his tracks and pointed his finger skyward. "Rose-breasted grosbeak!" he declared. The canopy was thick, and the bird sang twice more before we found it by eye, but there it was — hooded head, big bill, strawberry Y on the breast. It's a species that doesn't nest in the Southeast, and I asked John where he'd learned the song. He shrugged. "I heard one sing before — one day in Gainesville, about four or five years ago."

I'd been envying John's abilities for quite a while, but this was too much. "You heard it once — five years ago? I can't remember the song of the cardinal I heard yesterday!"

John chuckled over that for a while — he knew from other walks with me that it was no exaggeration. "Well," he said finally, eyes glinting, "I guess some of us have it, and some of us don't."

Birding by ear is not one of those skills like bicycle riding or swimming that can be mastered by just about anyone willing to give it a try. Birding by ear is more like chess, juggling, and automobile repair. Those who master it were born with a gift; the most the rest of us can hope for is minimal competence.

You won't find many good ear-birders willing to admit this fact, however. Most seem to believe our acoustic systems are made out of the same flesh and bone theirs are. Rick Bonney once nodded his head when I claimed the Canada warbler had a difficult song to remember. "You're right," he said. "That one is tough. How does it go again?" Then he pursed his lips and whistled the song. Unfortunately, I wasn't wearing my pointed boots that day.

Tin-ears have to approach the world of bird sound with an intensity and determination unappreciated by birders more gifted than us. My advice, based on long experience with a pair of ears that clang in the breeze, is . . .

1. *Abandon the Proustian method*, a.k.a. the "Ah-yes" system of song identification. You have probably seen good ear-birders use this technique in the field. It couldn't look easier. They listen for a moment, snap their fingers, and name the bird, even if they haven't heard the species in years. If it's a bird they have never heard before, they listen for a few moments longer than usual, then nod in gratitude — one more song has been added to their mental list. If you are a genuine tin-ear, you must abandon all hope that this technique will ever work for you. Waiting for the world of bird song to suddenly make sense is like hoping you will one day wake up able to juggle swords or tune a carburetor.

2. *Write your own transcriptions*. This is, of course, the standard suggestion in books and articles about ear birding: "Take notes in the field." Tin-ear birders need to realize two things about note-taking, however. First, no matter how often you have seen this technique recommended in print, you will never, ever, see anyone practicing it in the field. Good ear-birders seem not to need to take notes, and tin-ears are too defensive and self-conscious to do so, at least in public. The second thing to realize is that the transcribing will probably not go as you might hope. Your descriptions for the same species will differ from day to day and will rarely, if ever, match textbook and field guide descriptions. In fact, true tin-ears may find their pencilled renditions bear so little resemblance to the published transcriptions of the experts that the temptation is to burn the note pad and bury the ashes. In *Life Histories of North American Wood Warblers*, for instance, A.C. Bent transcribed the magnolia warbler's song as *switter, switter, swirr* or *wheet, wheet, tit, chew*, while A. A. Saunders observed, "The six-note songs usually consist of three two-note phrases, the first are just alike, the two notes of each phrase on different pitches. The third phrase is either higher or lower in pitch, and frequently with the

order of pitch from low to high or from high to low reversed." (If you can follow Saunders' description, you can't be a genuine tin-ear and are hereby excused from this column. Go sing in the shower.) Meanwhile, what do your notes say? Last Tuesday, you heard the magnolia sing *Tie my Edsel to the sink!* On Friday, it sounded like *bssssszzzzbbrrrzeeexxkkrgrr*.

Put out that match. Save those notes. They may not look like much, but they're a start, and they're real, and they document how you heard the bird. One day you will find yourself slapping Bent shut and declaring, "I don't care what he says. I say it's *Tie my Edsel to the sink!*" Pat yourself on the back. You have taken a significant step toward tin-ear survival.

3. *Buy recordings*. Looking back on my own decade-long reluctance to buy tapes or records of bird sounds, I realize I was operating under the same self-defeating psychological strategy I see students follow at the college where I teach. Those who most need extra assistance are the least likely to seek it out. The reason: none of us want to be reminded of our deficiencies. We hope that, if we ignore them long enough, they will either disappear or become irrelevant. "Ah, I can always find a good job that won't require me to know how to write," my students tell me. "Ah, I can always find any good bird by eye," I told myself.

My nominees as the most useful bird sound recordings are the two three-cassette sets by Richard K. Walton and Robert W. Lawson, *Birding By Ear: East and Central* and *Birding By Ear: Western* (Houghton Mifflin). Rather than follow taxonomic order, as is usually done on bird sound tapes, Walton and Lawson group the birds with their sound-alikes: thus, the warbling vireo is grouped with finches, the eastern kingbird with the cedar waxwing, and the junco with the chipping sparrow. Music terminology ("pitch," "notes," and so on) is kept to a minimum, and Walton and Lawson create some terms of their own, "sing-songers," "trillers-plus," and others, that even a tin-ear can understand. Best of all, each species sings on the tape as it does in the wild, with natural pauses between repetitions. The songs are repeated a third time in a separate section of the tapes arranged by habitat preference, an important and often overlooked clue even good ear-birders must use.

For a true tin-ear, no aspect of birding is half as tough as identifying birds by their songs

In giving each species more attention, Walton and Lawson must limit their selection. Each set of three cassettes covers about 100 species; the standard Peterson two-cassette set, *Field Guide To Bird Songs For Eastern And Central North America*, features more than 250 species. A hundred songs is quite enough for a tin-ear, though. If you can train yourself to identify even 50 birds by ear, you will be able to hold your own on most field trips.

4. *Berlitz it at home*. Tin-ears find learning bird songs out in the field particularly difficult because it's so easy to be distracted by the birds you can see. An unknown bird sings from somewhere off in the woods while a redstart dances over your head. "Shall I fight through the branches and briers in the hope of spotting that other bird? Nah, I think I'll study the foraging behavior of this redstart." This is the equivalent of the math major working on next week's calculus problems instead of the English composition due yesterday.

You will make faster progress, especially in the beginning, if you work on your ear birding when there are no real birds around — at home, after dark, with the shades pulled down. Get out your note pad and turn on your tapes. Two other teaching tapes you might find especially useful are *A Birdsong Tutor For Visually Handicapped Individuals*, which has many simple tips for helping anyone learn bird songs, and *Warblers Of North America*, with 325 examples representing all 57 North American species. You can supplement your collection of sounds with nonteaching recordings such as *Songs of Spring*, *Birds On A May Morning*, *Dawn Chorus*, *Voices Of The Loon*, and others.

5. *Create your own tapes*. If your ears are as bad as mine, you might find that none of the tapes above is enough; even the Walton/Lawson system needs enhancement. I have taken to creating my own tapes: choosing the 5 or 10 bird songs I would most like to learn and copying them to another tape 15 or 20 times over, so the same song repeats for several minutes. I leave out the narrative, and when I play back the tape I rewind and fast forward at random so I am forced to try to identify the song on my own. These customized tapes are especially effective for last-minute cram sessions; I play them in my car on my way to the next songbird hot spot.

6. *Don't despair*. Yes, it's true that for a true tin-ear no other aspect of birding is even half as tough as identifying birds by their songs and calls. But keep the faith: if you concentrate on it long enough, if you work hard at listening more carefully all spring and summer, if you train your ears as best you can, then May will turn into June, June will turn into July, the warblers will depart in September, the thrushes will be gone by October, and before you know it, you'll be out on one of those lovely, sub-freezing days in December when the sleet is whipping into your face from three directions, the good ear-birders are home in their beds listening to Mozart, and the only bird sound you have to identify is the occasional bleat of a herring gull. Enjoy it while you can! □

GOOD HAWKING

Richard E. Bonney, Jr.

My lifelong passion for watching birds began with a flight of hawks. I was only 10 years old, so my recollection of the occasion is a bit hazy, but I know it happened in Montclair, New Jersey, on a cold November afternoon. I remember hot chocolate in a thermos, a woolen blanket around my shoulders, a pair of Mirakel specials around my neck . . . and dozens of hawks soaring past on a ragged wind. Red-tails, red-shoulders, even a rough-leg, according to my Dad, who remembers the day somewhat better than I. Watching the birds pass overhead I became hooked on hawks.

I haven't been back to the Montclair Hawk Lookout in many years, but I know that each fall dozens of folks still congregate there to watch and count hawks, just like we did nearly 30 years ago. And it's not only in Montclair that this annual rite occurs. In just a few weeks, all across the continent, hawk nuts will be gearing up to take the pulse of the new season's sights. From Fire Island, New York, to the Goshute Mountains in Nevada; from Hawk Ridge, Minnesota, to Bentsen State Park in Texas — at all these lookouts and dozens more, birders will congregate with their binoculars, scopes, pillows, and hot drinks to watch the masters of the air soar past on their way south to winter haunts.

Some autumn hawk counts can be spectacular. At the Lake Erie Metro Park, for example, 21,908 broad-wings were spotted on September 17, 1989. On October 7, 1,018 sharp-shinned hawks flew past Waggoner's Gap, Pennsylvania. And on November 5 of the same year, 205 red-tails were counted at Hawk Hill, California.

How do I know these statistics? Simple. I found them in the September 1990 issue of *Hawk Migration Studies*, the journal of the Hawk Migration Association of North America (HMANA). That issue details the autumn 1989 flight data from more than 100 hawk watch sites throughout the continent. And guess what? Virtually all of this information was contributed to the HMANA network by volunteers — by birders who identified and counted the hawks at local lookouts and sent their data, recorded on official HMANA daily report forms, to the 17 regional editors.

To understand how this intriguing organization came about, travel with me back to April 1974. It's Saturday afternoon in a hotel in Syracuse, New York. In progress is the first-ever conference on hawk migration, sponsored by the National Audubon Society and the Hawk Mountain Sanctuary Association. More than 300 raptor enthusiasts have come to listen to presentations and participate in working sessions. Right now a group of hawk watchers is intently discussing the creation of a hawk migration study network. Discoursing is Michael Harwood, a professional writer and amateur ornithologist who likes watching hawks better than anything.

"What we most need to resolve," Mike is saying, "is the variety of reporting methods. Many of us who keep data have developed our own report forms, with different ways of reporting weather, species, age, and sex of hawks, and unidentified birds. To the potential student of continental migratory movements, this presents a hopeless muddle of data."

The future of North American raptors will depend on how well we keep track of populations

Nobody disagrees, and by the end of the session, consensus on this and many other matters is reached. HMANA is hatched! Mike Harwood is appointed chair of the new organization. For purposes of reporting data, North America is divided into nine hawk-watching regions, with regional editor/representatives appointed for each. The initial charge for HMANA's fledgling executive committee is to produce a standard daily report form to be used by all participating hawk watchers, spring and fall.

And what, exactly, will these hawk watchers be participating in? The report forms, filled out after each hawk-watching season, will be sent to the regional editors, who will use them to prepare seasonal reports on the raptor migration throughout their respective areas. The nine reports will then be sent to HMANA's chief editor, who will prepare a summary report on the migration throughout North America. Next, all 10 reports will be published together and distributed to members of the organization. Finally, all the daily report forms will be collected and filed in one accessible location as a service to researchers studying the phenomenon of hawk migration.

A tall order for a brand-new organization composed entirely of volunteers, wouldn't you say? The amazing thing is that now, almost 20 years later, HMANA has done what it set out to do and is still going strong.

One simple measure of the organization's success is the continual evolution of its newsletter. The inaugural issue, which reported on the spring migration in 1975, is a five-page, typewritten, folded-on-legal-paper document containing summaries of the few scattered reports submitted to regional editors that year. In the continental summary, editor Pershing B. Hofslund complains about the paucity of spring records and with tongue in cheek writes that from those records it might be possible to prove that hawks do not return in the spring.

Contrast that issue with the one of February 1990, a 100-plus-page effort with colored cover and detailed graphics. This volume contains so much data that even the continental summary is

JOE McDONALD

Raptor watchers of all ages flock to Hawk Mountain, Pennsylvania during migration.

broken down into three regional summaries: western, central, and eastern.

Yet HMANA's recent newsletters are remarkable for more than the volume of data reported. The September 1990 issue contains, as expected, page after page of reports on the autumn 1989 migration. But there's much more: a feature on the occurrence of the Swainson's hawk in eastern North America; an article on the endangered spotted owl; an article called "From Idea to Press Kit — Creating a Birds of Prey Event." All in all, this newsletter is a useful and professional effort — an incredible effort from an organization run entirely by volunteers.

HMANA has had its share of problems, of course. The biggest one, foretold by Mike Harwood way back at the organizational conference, has been the creation and maintenance of the standardized daily report form. Discussions about the form appear in the newsletter constantly. As a result, the forms are presently under revision. Getting the data computerized has also proven difficult; so far, only a small portion of the data has been keypunched.

But the biggest question, the one that gets asked over and over about any data collection effort, is this: are the data really useful?

The answer is an unqualified yes. For one thing, ambitious HMANA members have discovered dozens of new lookouts in the past few years, often in places where migrating hawks were not known to occur. Examining reports from these sites along with more traditional lookouts has done much to illuminate the overall picture of North American hawk migration.

On a more quantitative level, Paul Kerlinger, director of the Cape May Bird Observatory and a member of HMANA's research committee, wrote this in the February 1990 newsletter:

"Hawk migration counts have several scientific and conservation uses. Most important, they can be used to monitor populations. If a hawk population is declining, hawk counts should show a downward trend.

"Hawk migration counts are also useful for determining if a site should be preserved . . . . In places like south Texas and Cape May, New Jersey, where forest patches are mere remnants of their former extent, hawk counts supported decisions by the U.S. Fish and Wildlife Service to acquire forested habitat for inclusion in our National Wildlife Refuge System.

"The future of North American raptors will, in many respects, depend on how well we keep track of populations and how we use our hawk migration counts," Paul concluded. "HMANA will take a leading role in the collection, storage, and analysis of these data."

And that means you can take a leading role, too. If you can identify hawks, you can join the HMANA network. While some of the major hawk lookouts already have regular coverage, more than 100 other lookouts still need observers, especially on weekdays. And there are always more lookouts to be found. Furthermore, you can "work" as much or as little as you wish. HMANA member Pete Laurie reflects on his hawkwatching efforts on the South Carolina coast during his hour-long lunch break:

"Almost anyone, anywhere, could conduct a hawkwatch in their free time. Even if you record only a small number of migrating raptors your information will add a useful piece to the puzzle. If your hawk counts are conducted hundreds of miles from other lookouts, your data can fill in the gaps between the better-covered lookouts. Regardless of your circumstances, you can contribute to the knowledge of hawk migration."

As Mike Harwood would have said: "Good hawking!" □

You are invited to become a volunteer hawkwatcher. To obtain free daily report forms and instructions, or to get more information on the Hawk Migration Association of North America, write: HMANA, P.O. Box 3482, Rivermont Station, Lynchburg, Virginia 24503.

"THEM OL' BINOCULAR BLUES"

Pete Dunne

There comes a day in every birder's life when loyalty and sentimentality must be set aside. When the erosive forces of time and sand and shirttails must be acknowledged. When you think that you must surely strangle Oscar and Herta if they utter one more peep about the hyper-priced, hyper-quality binoculars they gave each other for Christmas . . . .

In short, there comes the pivotal point in every birder's life when it's time to replace old binoculars with new ones.

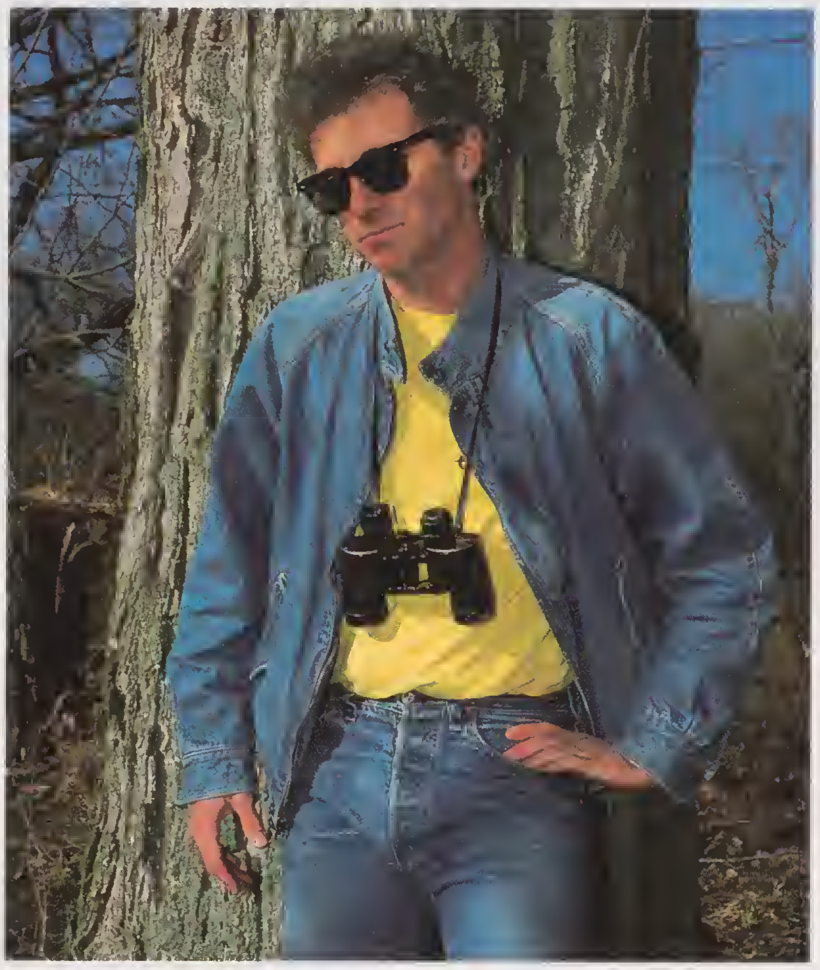
I know! I KNOW! *I KNOW!* Wait.

Nobody is forcing you to do anything you don't want to do. This is America. So calm down. Take a couple of deep breaths. Think of clouds. Think of waves lapping against the shore. Just hear me out, okay?

I know how much your binoculars mean to you; how much the two of you have gone through. They were the glass that brought you to a whole new world of discovery. The instrument that proved once and for all that the legs of least sandpipers really are yellow!

Ten thousand migrating broad-winged hawks have been filtered down those prismed tubes. And half a million chickadees in single digit installments, not to mention the first phoebe of spring 20 years running and that house wren on the 1978 Christmas Bird Count — the one that made Oscar drop his dentures into the punch.

On the left barrel is the souvenir ding they got at Samburu Lodge when the waiter walked up to your table and whispered "leopard," and the right bears the scars from the climb for the Colima warbler.



This man would be smiling if he had a new Uberglass.

RACHEL DICKINSON

The successful climb for the Colima warbler!

There's metal showing where your hands (and *only* your hands) rest, and as for focusing . . . why, they nearly focus themselves, don't they?

All these things are so. You and that glass have been through a lot and you enjoy a friendship that goes back to an age when blue geese were countable; maybe even back to a time when dowitchers were identifiable (because there was only one species).

But as with most old friendships, you've probably chosen to overlook a mounting number of irks and quirks that niggle and nag — the focus wheel that sticks; the spot of mold in the right barrel that makes everything look like it's part of the Crab Nebula; the string that has (temporarily) served as a strap since around the time Bruce Springsteen first hit the charts.

And what you can't overlook, you've chosen to ignore. The headache you have by the end of the day. Those impossible-to-see field marks that differentiate flycatchers from dowitchers. The smug look on Oscar's face every time he gets on a bird before it flies and you don't.

But the heart of the matter is this: Birding is an activity that is supposed to give pleasure, and better optics provide greater pleasure. They enhance what you see, because they make it easier for you to see it. Good Bordeaux wines and Stradivarius violins improve with age. Optics do not. Parts wear. Image quality deteriorates.

You might ask, "Can't I just get my old pair cleaned?" Yes, you can! But flushing out all the gunk that builds up inside binoculars is not going to imbue old binoculars with the fruits of 30 years of optical technology. The finest optics available when the Edsel was in production cannot offer what even many mid-priced binoculars do today.

Please. Do yourself a favor. Go over to Oscar and Herta. Ask to peek through their new Uberglasses. Compare the image quality with the image in your binoculars. I think you are going to be stunned.

Wait till you see how bright they are. Bet you've forgotten that the world isn't supposed to look like someone spread mustard all over it.

Wait till you see how easy it is to get on a moving bird. Why, there are binoculars on the market today that will give you the reflexes of a 16-year-old again. (Some of the reflexes, anyway.)

Wait till you train them on some common birds. They make robins come alive, turn blue jays into visions, make starlings look good!

As for your old glass, your faithful comrade at arms, remember: Old binoculars never die. They just go into the reserves where they remain close at hand — on the window in front of the feeder; beneath the front seat of the car — always there in times of need. □

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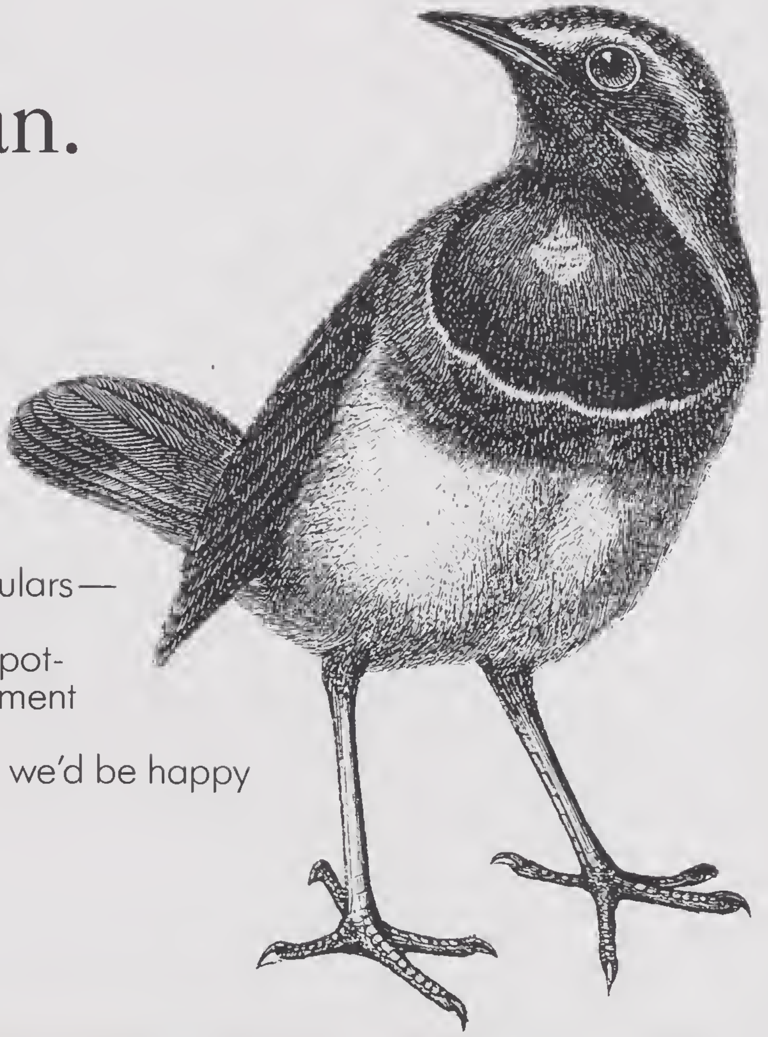

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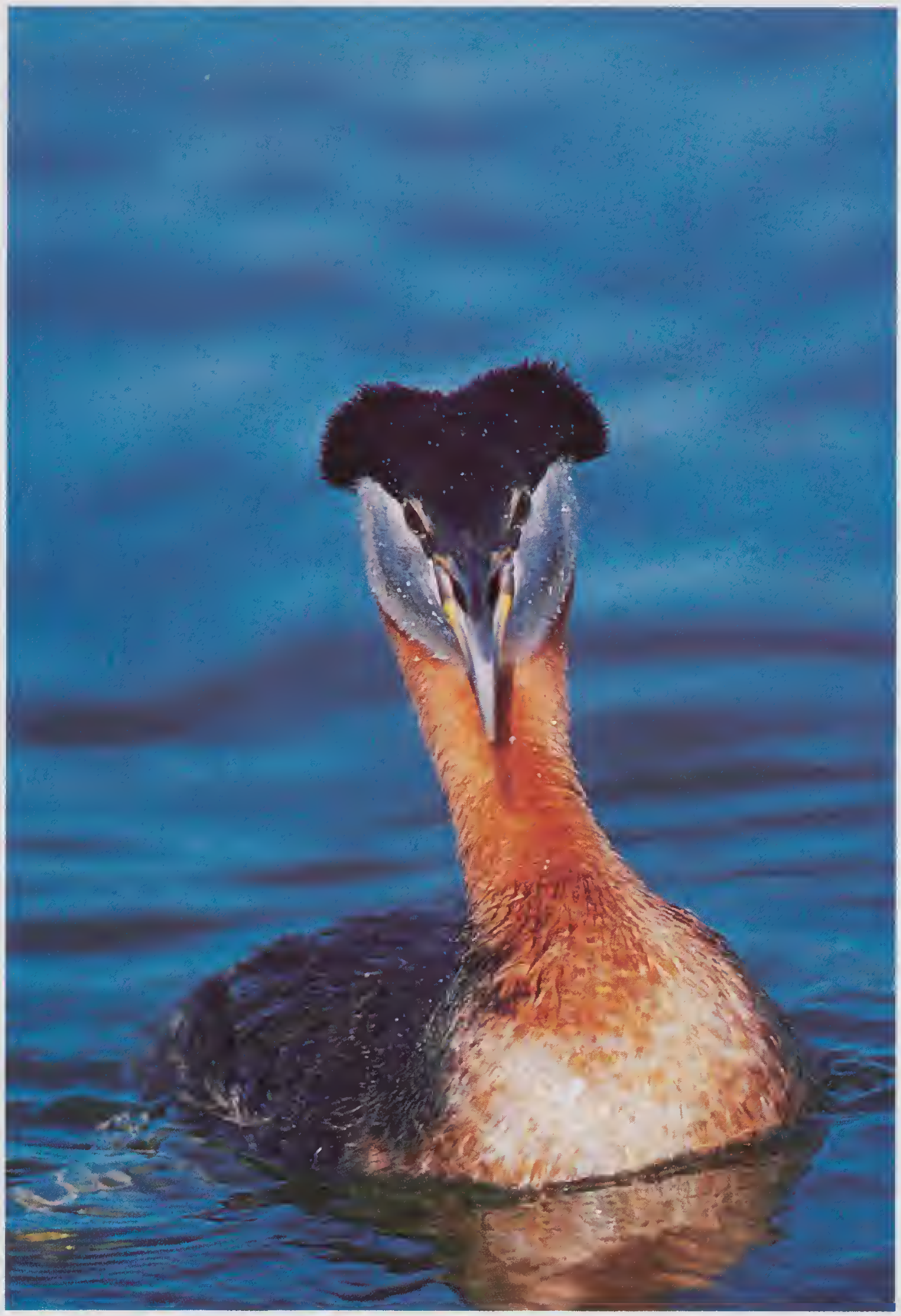


Cornell Laboratory of Ornithology

BIRDSCOPE

The research newsletter of the Cornell Laboratory of Ornithology ▪ *Volume 5, Number 3* ▪ *Summer 1991*

The Sounds of Science

Nathaniel Comfort

From fruitflies to whales, Bioacoustics students analyze animal sounds

Were you to walk into the Lab this past spring, you might have thought one end of the building had turned into an eclectic zoo. Woodcreeper trills, elephant rumbles, the moaning of bowhead whales, and the buzzing wingbeat "songs" of courting Hawaiian fruitflies poured out into the corridor. It sounded as if the beasts were right down the hall.

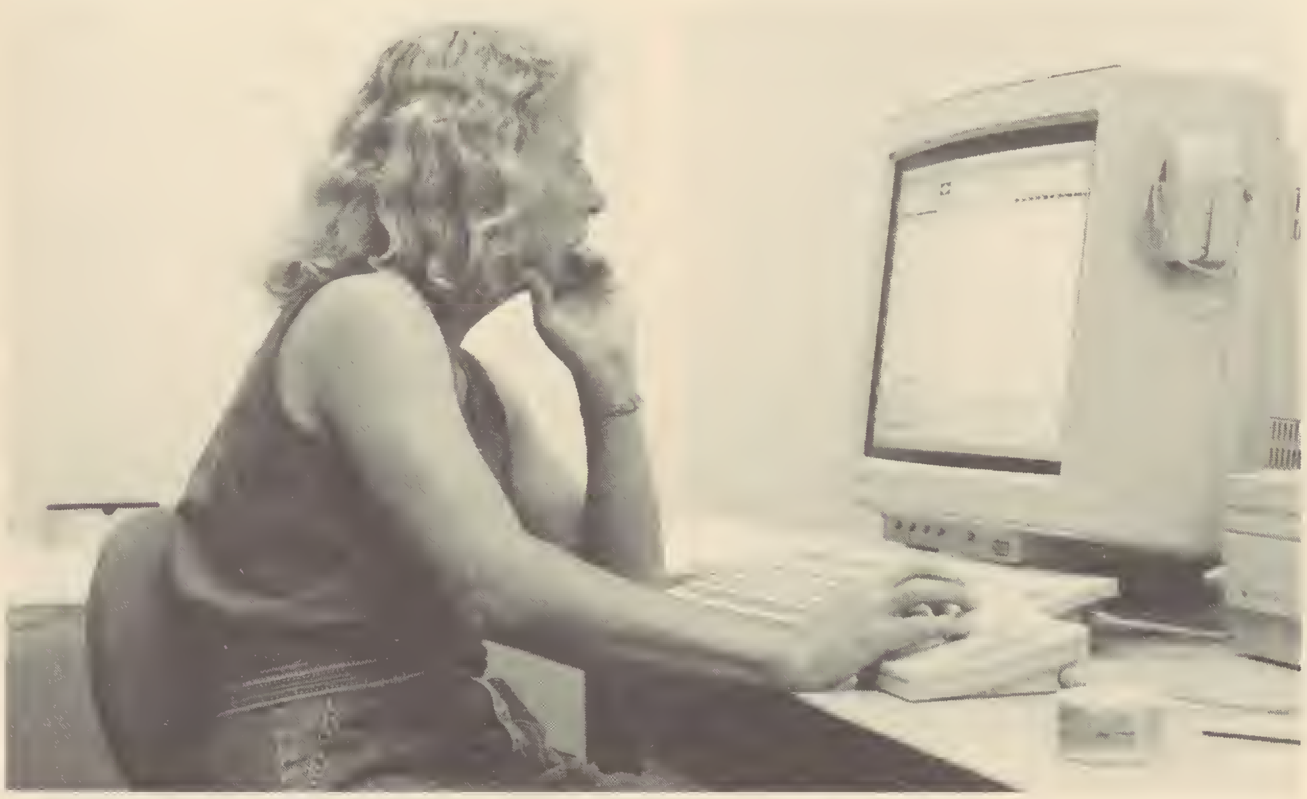
But this aural menagerie was not made of flesh and bone or chitin; it was magnetic, electronic, and digital. Cornell University students and staff were analyzing animal communication signals as part of an experimental course. Called "Bioacoustic Signals in Animals and Man," the new course was co-taught by Bioacoustics Research Program director Christopher S. Clark and Ron Hoy, chairman of Cornell's section of neurobiology and behavior. Their 13 students attended lectures on the biology, physics, and analysis of sound. At the end of the course they conducted research projects using BRP's new Macintosh computer systems.

The course provided a unique learning opportunity; perhaps nowhere else in the world can a student's first exposure to sound analysis be on such state-of-the-art equipment. Class participants used a software and hardware package called MacRecorder to digitize the sounds captured with conventional tape recorders, enter the digitized sounds into the computer, and then dissect and analyze them. And for a taste of true cutting-edge research, the students used a brand-new computer program called "BW" that is being developed in Bioacoustics. And we mean brand-new; even as students worked on their projects at the BRP facility, programmer Steve Mitchell would walk over and hand someone a floppy disk with the latest version of BW, saying, "Here. Try this."

The projects all had a common theme: extracting from natural sounds such distinguishing features such as frequency, duration, or amplitude. Using these features, a researcher can answer a variety of questions about the acoustic biology of the study animal. For example, undergraduate John Lai used the system to develop hypotheses about how a sound evolved within a group of related species; the ultimate goal was to come up with an "acoustic phylogeny," a sort of audible evolutionary tree.

John's advisor is Ron Hoy, who studies evolution and communication in a group of Hawaiian fruitflies called "picture wings." Male flies court females by rhythmically beating their wings; each species of fly has its own distinctive wingbeat pattern, just as different species of birds sing distinctive songs. Ron gave John a set of recordings of different species of flies whose evolutionary relationships are already known. But he didn't tell John which fly was related to which. John's mission was to create his own fly phylogeny based on acoustic characters of his own choosing.

Scott Fannin and Linda Kim performed a similar classification exercise using songs recorded from three populations of a single Australian bird species, the flowerpecker. DNA analyses by Lab associate Mary Katz, who also recorded the songs Scott and Linda used, suggest the different populations of flowerpeckers


TIM GALLAGHER

Grad student Laura Brown analyzes woodcreeper calls using one of BRP's new computer systems.

LNS Technical Bulletin Available

The Library of Natural Sounds publishes a technical newsletter for LNS contributors and users. The biannual newsletter offers useful technical tips for sound recordists, and also covers LNS projects and activities in more detail than we can here in *Birdscope*. If you would like to receive the *Library of Natural Sounds Bulletin,* write to Donna Palmer, Library of Natural Sounds, 159 Sapsucker Woods Road, Ithaca, New York 14850.

are beginning to separate into new species. Looking at the results of their audio analysis, Scott and Linda cautiously suggest that the flowerpecker's song is evolving in parallel with the bird's genes.

Several students used the computers to compare different song types. Andy Carlson and Todd Tracy made recordings of canary song before and after surgical lesion of a small brain area called LMAN, which is known to be involved with song learning or production. They used MacRecorder and BW to compare the "before" songs with songs recorded at various times after the lesion had been made, and found that the song seemed to deteriorate progressively with time after the lesion. Their results may imply that LMAN is involved in vocal learning in adult birds.

Grad student Laura Brown worked on the songs of *Xiphorhynchus*, a genus of South American birds called woodcreepers. Laura analyzed several calls from each species of *Xiphorhynchus* catalogued in the Lab's Library of Natural Sounds. She hoped to determine whether each set of calls came from a distinct species or, in some cases, the same species; she also wanted to measure how the songs of the various woodcreeper species differed from one another. Her partner, Tom Calupca, wrote a computer program that makes a dichotomous key of sounds. Just tell the computer what features you want it to use — maximum frequency, trill duration, or amplitude range, for example — enter your sounds using MacRecorder, and the program generates a branching tree that separates the sounds into groups of like and unlike.

The computer can even be used to sort out a song from a scrape. At Point Barrow, Alaska, when the sea ice breaks up, huge chunks of ice scrape past one another, making a variety of sounds, some of which sound almost exactly like the vocalizations of bowhead whales. Olivier Georgiades and Beth Weisburn analyzed underwater recordings from Point Barrow to identify features in the ice and in the whale sounds that can be used to distinguish the two.

A spring sound that's ubiquitous in Ithaca suggested a research project to two first-year grad students. Jessica McKibben and Steve Pratt studied the tiny frogs called spring peepers. Female peepers choose a mate on the basis of his call. Now old, experienced peepers are larger than young, small ones, so it would benefit both sexes if males could communicate their size (and ergo their age and ability to survive) by their call. Steve and Jessica tested the hypothesis that the larger the male, the lower the pitch of his call. BRP gamely loaned the students thousands of dollars' worth of equipment for a foray into a rainy, muddy pasture to record and measure frogs. The results do support the hypothesis, except for one big, countertenor frog who apparently wasn't familiar with the literature.

Two of the students in the experimental course were hardly new to the field of animal communication. Lab of Ornithology researchers Katy Payne and Bill Langbauer study the low-frequency sounds made by African elephants. Katy and Bill teamed up with Greg Gerst to use the new technology to try to associate the sounds of elephants with particular behaviors (for example, to identify the characteristics of the call of a male in the sexual heat known as *musthe*) and also to identify the "signature" sounds of a given animal.

Do these veteran researchers think the new, high-tech systems will ever replace the old methods: staring at mile-long strips of acoustic printouts and listening to tapes? "I did it the old way for 20 years — with real-time spectrograms and a ruler," said Katy. "This system allows a much finer analysis." But Bill added, "The eyes and ears are still great computers." □

TIM GALLAGHER

Project FeederWatch Goes to School

Birds are the keystone in a novel curriculum that teaches children not only math and science but art, writing, and history

Even by Ithaca standards, March 4, 1991 was a lousy day. Still, a group of environmental educators from around New York braved wet, heavy snow to gather at the Lab to discuss a novel idea: an elementary school curriculum focusing on birds. Just before the participants arrived, an old pine fell on the Sapsucker Woods power line, cutting off the light and heat. So the conferees moved tables against the big observatory windows, pulled on sweaters, and settled in for some inspired brainstorming.

Out of that cold, dark day came an exciting plan for a collaboration between the Lab and the Roger Tory Peterson Institute (RTPI). This year the organizations will develop and test an elementary school curriculum that uses birds as the keystone in a program to promote appreciation and understanding of the natural world. The conferees recommended that the curriculum be modeled on Project FeederWatch, a successful and popular Lab program in which volunteer birdwatchers collect information about the birds at their backyard feeders.

FeederWatch was chosen as the basis

for the school curriculum because out of its 7,600 participants, over 50 are schoolteachers who already ask their students to observe and count birds at school feeders. Many of these teachers have expressed enthusiasm for the way Project FeederWatch activities can be extended to a variety of topics in the New York State elementary curriculum, including not only science and mathematics but writing, art, and history.

The educators who met on that snowy day in March envisioned many benefits for the children who try out the new curriculum. Instead of conducting predictable, "canned" science lab exercises, they'll really be "doing" science. Students will become technology-literate as they use computers to manage their data and to communicate and compare results with students at other schools. The program will also encourage parents and communities to get involved as school bird feeding areas are established and improved. Most importantly, the educators hope the new curriculum will motivate children to take a lifelong interest, not only in birds and nature study, but in conservation and the many complex environmental issues that face our planet today.

The new multidisciplinary elementary curriculum is being developed by Todd Culver, the Lab's education specialist, and Bill Sharp, director of education at RTPI. It is slated to be piloted in several school districts in autumn of 1991. □

Birding for Dollars: Big Birdwatch 1991

Tim Gallagher

The Sapsuckers vie for prizes and pledges in New Jersey

May 18 has come and gone, and with it another Big BirdWatch — that annual birding extravaganza where teams vie to see who can find the most bird species in one 24-hour period. The Sapsuckers (the Lab's resident big day team) drove to New Jersey to compete with 37 other teams in the World Series of Birding, attempting to count the most bird species in the Garden State on May 18th. Meanwhile, Lab members and their friends from across North America participated on a local level, raising pledges for the Lab for the number of species found.

For the Lab team, the action began shortly after midnight in a tick-infested swamp in northern New Jersey. The Sapsuckers put up a bizarre cacophony of hoots, snorts, whistles, and croaks, then strained their ears to pick up the distant responses of a sora, a Virginia rail, and some barred owls. After adding a few more species to the score, the team drove on into the night.

At daybreak, the Sapsuckers stood beside a cow pasture, waiting for the dawn chorus to begin. The silence was broken, not by bird song, but by a dairy farmer calling his herd to the milking shed. The birds followed soon enough: grasshopper and savannah sparrows, bobolink, meadowlark.

The Sapsuckers continued their frenetic pace, driving to woodland habitat in the New Jersey highlands. Cruising through the trees with their windows down, the hard-driving birders picked out species after species of warbler. By 11:00 A.M., the Sapsuckers had tallied 110 species and seemed destined to break their existing big day record.

But fate had other plans. As the team headed south a cold front moved in, silencing the singing birds and driving them to shelter. Suddenly, locating each new species became as difficult as finding the proverbial hen's teeth. The stretch of sea where they'd spied the scoter and the

continued on page 4

TIM GALLAGHER

Sapsucker team members Rick Bonney, Todd Culver, and Ken Rosenberg scan for seabirds near Cape May on World Series Saturday.

Sign Up Now for Project FeederWatch

Feeding the birds is fun. It's also a great way to contribute to the understanding of bird populations — if you're a member of Project FeederWatch.

Now is the time to sign up for this continentwide survey of feeder birds. Each winter, from November to March, FeederWatch participants record the kinds and numbers of birds at their backyard feeders on specially designed, easy-to-use forms. Last winter over 7,000 people from all over North America contributed to this unique research program.

The project is a joint effort of the Cornell Lab of Ornithology and Long Point Bird Observatory, Port Rowan, Ontario. Ornithologists use FeederWatch data to monitor changes in bird abundance from year to year and to answer many other questions about populations of North American birds.

For more information about Project FeederWatch, call or write: Project FeederWatch, Cornell Lab of Ornithology, 159 Sapsucker Woods Road, Ithaca, New York 14850, (607) 254-2414.

AROUND THE LAB

■ One sign of spring in Sapsucker Woods is the perennially popular Field Ornithology course, a Lab-sponsored introduction to field birding. This past spring marked the 16th year that Audubon researcher **Steve Kress** has offered the course. The Wednesday night lectures (liberally sprinkled with slides, recorded bird songs, and Kress's dry wit) and the weekend field trips attracted about 80 participants, including several repeaters for whom the course is a personal rite of spring.

■ **Gregory Butcher**, director of Bird Population Studies, was elected vice president of the Association of Field Ornithologists (AFO) at the March 1991 annual meeting. At that same meeting he presented two talks: "The History of Cooperative Research Projects," and "Ornithology at Cornell University," the latter coauthored by **Rick Bonney** and **Greg Budney**. Project FeederWatch Coordinator **Erica H. Dunn** also spoke at the AFO meeting; her talk was titled "Winter Bird Mortality from Striking Residential Windows."

■ Bioacoustics Research Program director **Christopher S. Clark** was the United States delegate to the May 1991 International Whaling Commission scientific committee meeting. Clark also attended a meeting of the Acoustic Society of America in May, to speak on "Sounds Recorded in the Presence of the Sei Whale, *Balaenoptera borealis.*"

The Lab is pleased to announce that Clark was unanimously voted in as a member of the graduate faculty in Cornell's section of neurobiology and behavior. This is the first time the title has been given to someone who is not a resident member of the department.

■ The following individuals have visited the Library of Natural Sounds this past spring to edit and deposit sounds: Lester L. Short, American Museum of Natural History; Jennifer F. M. Horne, National Museum of Kenya; Theodore A. Parker III, Conservation International; Paul Coopmans, Victor Emmanuel Nature Tours; Bret Whitney, Field Guides Incorported; and Donald Kroodsma, University of Massachusetts, Amherst.

■ **Rick Bonney**, director of Education and Information Services, received third place in the Outdoor Writer's Association of America writing contest, "Take Pride in America." The contest, sponsored this year by Chevron USA, recognized "excellence in encouraging the public to take care of our natural and cultural resources." Bonney's article, "You Can Make a Difference," explained how to get involved in amateur ornithology projects.

■ Purple martin fans, you'll want to know about the newest LNS production, sponsored by the Purple Martin Conservation Association. "Purple Martin Dawnsong" is a 60-minute cassette recording of the male birds' distinctive and melodic morning flight songs. Martin landlords can broadcast the sounds to attract the birds to backyard martin apartments. To order, write to Edinboro University of Pennsylvania, Institute for Research and Community Services, Edinboro, Pennsylvania 16444.

■ Each year the Lab of Ornithology sponsors a number of birding tours for our members. In late January and early February of this year, LNS curator **Greg Budney** accompanied a special tour to Ecuador — an Advanced Sound Recording Workshop. At the famous La Selva Lodge along the Rio Napo, workshop participants obtained high quality recordings of the long-tailed potoo (its voice was unknown to science only four years ago) and the nocturnal currasow, a bird that's extremely wary and hard to record. Tour participants also traveled to Cotapaxi volcano, and to the lovely old hacienda of La Cienega, where they obtained a recording of the subtropical doriadito, a flycatcher, for the LNS collection.

continued from page 3

loon on a scouting expedition was now a raging, windswept mass of surging waves with no birds in sight. The little blue and tricolored herons that had been so easy to find the day before were now absent. The piping plovers at Cape May were nowhere to be found. But the Sapsuckers never slackened their pace. During the final minutes of May 18th they were shivering at the edge of an airport runway, trying in vain to pick out the sound of a singing horned lark over the roar of a freezing wind.

The final tally for the team was 167 species — not the best score the Sapsuckers have ever made, but two more than they found the year before and good enough for third place in the out-of-state competition.

It looks like Big BirdWatch 1991 will surpass all previous years in terms of fund-raising. The Lab is already calculating that more than $30,000 will be raised, and the pledges are still rolling in. We thank all the Lab members and friends whose efforts have made Big BirdWatch 1991 such a whopping success. Without your support it would be difficult to continue the Lab's many vital programs for conserving bird populations.

As for the Sapsuckers? They are already dreaming of Big BirdWatch 1992, and another chance at glory. □

The Leonard J. Waxdeck Bird Calling Contest winners who appeared on the Johnny Carson show on May 29th did a great job, didn't they? That's because they trained with sounds from the LNS collection. LNS sounds have also been requested for commercial ventures including an electronic encyclopedia and an alarm clock that plays a dawn chorus.

Birdscope, ISSN 1041-6676, is published in January, April, and July by the Cornell Laboratory of Ornithology, 159 Sapsucker Woods Road, Ithaca, New York 14850. Telephone: (607)254-BIRD. *Birdscope* is free to members of the Laboratory, a nonprofit, membership organization for the study, appreciation, and conservation of birds. For information on membership please write to our Membership Department. Copyright 1991 Cornell Laboratory of Ornithology.

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LIVING BIRD

For the Study and Conservation of Birds

AUTUMN 1991

TOM MANGELSEN

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LIVING BIRD

AUTUMN 1991 VOLUME 10 NUMBER 4

Greetings from Sapsucker Woods

Autumn is a time of change. Here at Sapsucker Woods the days are getting shorter. Soon the birds of summer—the great blue herons and tree swallows around the pond and the many woodland songbirds—will be heading to points south.

Autumn 1991 is also a time of change for this publication. You may already have noticed some of the alterations: the contents page has been streamlined to make the information more accessible; the columns and departments have a new format.

But probably the most noticeable change is the name of the magazine. *The Living Bird Quarterly* has become, simply, *Living Bird.* In shortening the name we hoped to put more emphasis on the magazine's (and the Lab's) primary subject: birds. The new cover logo also leaves room for the Lab's motto. "For the Study and Conservation of Birds" expresses the essence of our commitment to preserving bird populations through scientific study.

We are also committed to promoting the enjoyment of birds through our magazine. You will continue to find the unique blend of science and conservation news, bird lore, travel, art, equipment reviews, and stunning photographs that you are used to seeing in these pages, along with some interesting additions.

We would very much appreciate hearing your comments on the new *Living Bird.* Are there changes that you particularly like or dislike? Are there any other changes you would like to see? As a Lab member, you are a valued partner in our work, and your input has a definite influence on all our publications, programs, and policies.

Tim Gallagher, Editor

Features

10 **Canaries in the Global Mine**
by Paul R. Ehrlich
Bird populations throughout the world are crashing. Should anyone besides birders really care?

14 **Albatross: Bird of Mystery and Myth**
by Julie Ridl
How an 18th-century sea captain and a troubled Romantic poet joined forces to sully a noble bird's reputation.

20 **Birding by the Bottle**
by Peter Stangel
Forget your binoculars! Leave your spotting scope at home! On this birding trip only a corkscrew is *de rigueur.*

24 **Networking**
by Laura X. Payne
Scientists throughout the Western Hemisphere are working together to save vital shorebird habitat.

30 **Aloft Again**
by Tim Gallagher
The last wild California condors were trapped in 1987. Will the species ever fly free again? Yes; perhaps as soon as this winter.

Departments

4 **Letters**

5 **BirdNews**

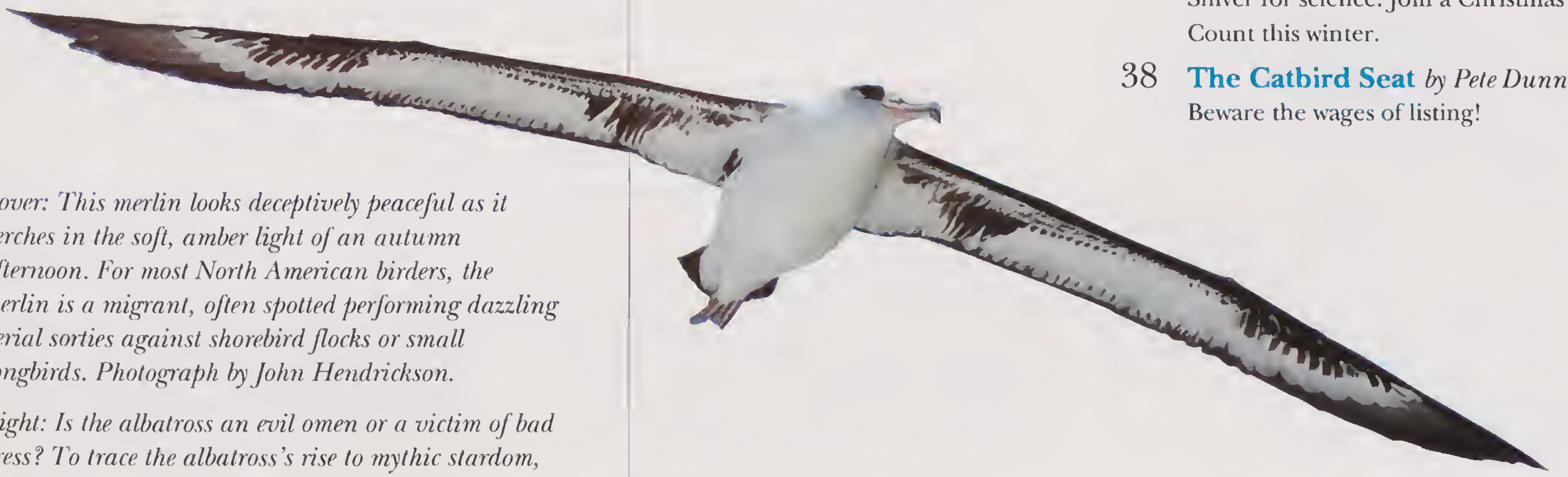
36 **Critics' Corner**

Columns

6 **Flying Field** *by Mel White*
A spine-tingling encounter with a California condor.

8 **Beyond the Field Guide**
by Richard E. Bonney, Jr.
Shiver for science: Join a Christmas Bird Count this winter.

38 **The Catbird Seat** *by Pete Dunne*
Beware the wages of listing!



Cover: This merlin looks deceptively peaceful as it perches in the soft, amber light of an autumn afternoon. For most North American birders, the merlin is a migrant, often spotted performing dazzling aerial sorties against shorebird flocks or small songbirds. Photograph by John Hendrickson.

Right: Is the albatross an evil omen or a victim of bad press? To trace the albatross's rise to mythic stardom, turn to page 14. Photograph by Frans Lanting.

LIVING BIRD

AUTUMN 1991 VOLUME 10 NUMBER 4

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Letters

Of Gulls and Grazing Areas

I enjoyed the Spring 1991 issue, especially since it related to two personal experiences. First, to Roger Swain's list of birds that can devastate blueberry fields ("Blue Birdfood") let me add herring gulls. While I was at the University of Maine in 1936–37, I conducted research on the commercial management of wild blueberry fields. I remember that at high tide, flocks of herring gulls would sweep inland to feed; ripening blueberries were their favorite. A large flock of gulls could wipe out a 20-acre blueberry field in half a day.

Charles Smith's article in the same issue about the Finger Lakes National Forest was a particular delight. Back in 1965–66, when I was head of Cornell's Department of Conservation (now Natural Resources) I spent much of my time dissuading the U.S. Forest Service from selling the Hector Grazing Area, as it was then called, to the cattle growers who leased the grazing rights. The tract was so small that the Forest Service considered it a nuisance rather than an asset, and no Forest Service Chief had even seen it until we persuaded Ed Cliff to visit in April 1966.

Dr. Smith may be interested to know that the 88-acre farm where I lived during my 18 years at Cornell was also home to several nesting Henslow's sparrows. We had no cattle, so we maintained the proper grassland type for them in one 20-acre field by mowing after nesting season.

Gustav Swanson
Minneapolis, Minnesota

Another Fundamental Truth

Pete Dunne's article, "Keeping the Faith" (Spring 1991), reminded me of a May bird walk in Massachusetts some years ago. I spotted a magnificent male magnolia warbler, and told the leader. "I don't hear it singing," she declared, and walked on without looking at the bird or telling the group about it. Every spring when I see a silent warbler, I wonder how many birds that leader has failed to enjoy or to share with others over the years because of her belief that if the bird isn't singing, it doesn't exist.

Dorothy R. Weaver
Atlantic Mine, Minnesota

Gardeners Please Note

Believing strongly in the merits of landscaping for wildlife, we are always pleased to see articles on this subject ("Landscaping for Birds," Winter 1991). We feel further comment is necessary to dispel a few misconceptions.

First, your readers should not, even unintentionally, be led to believe that destruction of woodlands is acceptable as long as the development which replaces them has been landscaped for wildlife. A suburb full of backyards landscaped for wildlife cannot compensate for a woodland that has been lost to development.

Second, our hearts flutter when the author states "Don't worry if you order from a nursery in a different hardiness zone. Plants that are hardy in your region will adapt to your climate . . . ." While this advice is harmless in many cases, seed origin (provenance) is an important factor when purchasing seedlings (as opposed to vegetatively propagated "cultivars") of native trees and shrubs. Seed collected in one region may give rise to plants completely unadapted to another region. The safest course of action is to plant seedlings either from "local seed" or from a region with a similar climate. Inexperienced gardeners should consult with a county extension service horticulturist before making a major investment in plants from a nursery in a different hardiness zone.

Bernie Galgoci & Martha Peterson
South Burlington, Vermont

We welcome letters from readers.
Address letters to: The Editors,
Living Bird, 159 Sapsucker Woods
Road, Ithaca, New York 14850

BirdNews

Hobby by Tom Heindel

AFTER THE WAR

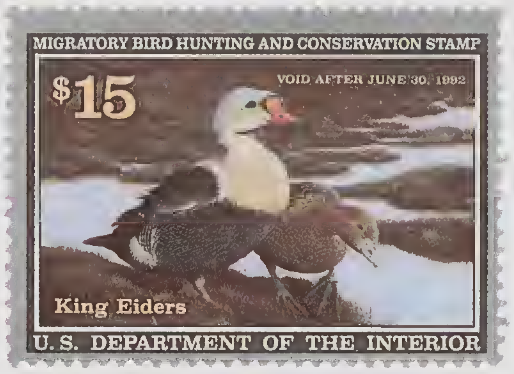
The recent Gulf War has been a disaster for birds. Some birds endemic to the Gulf area, such as the golden-winged grosbeak, olive-rumped serin, and Arabian waxbill, are restricted to the southwest corner of the Arabian Peninsula, distant from the war zone, and so have been unaffected. The extremely rare houbara bustard and the uncommon stone curlew, however, seek isolated areas in the northern desert where they can avoid the Bedouins and falconers who hunt them. Now this isolation no longer exists. Nesting birds such as bar-tailed desert lark, hoopoe lark, and Dunn's lark also have had difficulty finding undisturbed desert in which to breed. And many raptors that regularly winter in this area have been displaced, including long-legged buzzard, steppe eagle, and hobby.

Meanwhile, the huge oil slick released from Kuwait's refineries continues to come ashore. A recent report from the Ornithological Society of the Middle East indicated that at least 50 percent of the shorebirds observed, including Caspian plover, little stint, and curlew sandpiper, had oil on their plumage. The Socotra cormorant, an endemic bird that nests on unpopulated offshore islands, is considered particularly vulnerable to the spill. When the oil first came ashore in late January 1991, volunteer groups from 11 nations joined together to clean birds and release them. But the effort was abandoned after it became obvious that the few birds that survived went back into polluted waters.

In addition to resident species, the Arabian Gulf supports a major movement of migratory birds each spring and fall. Large flocks of red-necked phalaropes feed and rest on open water; for them, landing on oil would be disastrous. Gulls and terns would be similarly affected, including black-headed, little, and slender-billed gulls and common, little, and white-cheeked terns.

Exactly how the Gulf War has affected birds is difficult to measure, however, because to date, no baseline population studies of Saudi Arabian avifauna have been conducted; this lack of data makes comparisons of present and past population levels impossible. Birders who live in the area say the Saudi Arabian government has released no information on numbers of birds killed, displaced, or prevented from nesting by war maneuvers or the oil spill. Sources also say they have seen no information in the Saudi press on recovery efforts and know of no scientific studies or censuses being conducted.

— Tom and Jo Heindel



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THE STAMP OF A WINNER

Winning the annual competition for the federal duck stamp is a fine achievement for any wildlife artist. But for this year's winner, Nancy Howe, it's just part of an impressive string of "firsts." Her work also has been chosen to appear in the prestigious Leigh Yawkey Woodson Art Museum exhibit, "Wildlife: The Artist's View," as well as the National Park Academy of Arts national tour, "Arts for the Parks." No other artist has received this triple honor in a single year. In addition, Howe is the first woman to win the duck stamp contest, and the first winning artist who has arranged to donate a portion of her duck stamp print sales to waterfowl conservation.

Mono Lake by Judy Burrill

MONO JOINS WHSRN

California's Mono Lake is the latest site to be added to the Western Hemisphere Shorebird Reserve Network (WHSRN). The salty lake made news recently when a court injunction limited diversions from its tributaries to the City of Los Angeles. This move was of particular interest to birders as the lake is a major nesting site for California gulls and an important stopover for migrating Wilson's phalaropes; the injunction should insure Mono's long-term health. For more on WHSRN, see page 24.

LIVING BIRD HONORED

We're pleased to announce that *Living Bird* has been awarded a silver medal in a national recognition program for college and university magazines. Sponsored by the Council for the Support and Advancement of Education (CASE), the program recognizes excellence in the pursuit of institutional goals and objectives. *Living Bird's* award was in the category, "Special Interest Magazines." This is the eighth year in a row that the magazine has been named a CASE medalist.

COMPILED BY CYNTHIA BERGER

Flying Field

THE CONDOR PASSES

by Mel White

A close encounter of the unforgettable kind

Every bird watcher has an All-Time Favorite Sighting—a set piece in the repertoire, ready to be hauled out and placed on the lectern with the most modest encouragement. I, as you are about to read, am no exception. What follows may be disguised as history, or as an essay on conservation, but it's really just my favorite bird story. I think of it sometimes when I wonder what birding will be like 20 years from now, and I tell it . . . . Well, I tell it every chance I get.

There's not much to do in Gorman, California, except get off the freeway and head west into condor country. Birders today continue to think of Los Padres National Forest as the home of the California condor, and at the time of my story there still were condors there—which was why I was passing through Gorman when my rental car decided that it was just too dang hot to work anymore. Or maybe it got confused and thought that the Fourth of July holiday was now, instead of last week. Anyway, I'd been waiting a long, long time when the replacement car arrived. I'd left Los Angeles early, thinking that the condors might soar on the first thermals of the day—and now here it was late morning and I still had 30 miles to drive. Was I going to be too late? Was the (potential) highlight of my first trip to California disappearing in the heat waves? Would this be a wasted day?

I drove past Mount Pinos to "The Sign," the famous condor lookout that had become the most reliable place to see the birds. Here I found the official Condor Watch observation post, with an official observer, and a notice that said, more or less, Please Do Not Bother the Condor Watcher. There were a few other birders, too, but not as many as I had pictured when I had imagined this moment. It was the middle of the day, and it was hot.

It didn't take long to see my first condor; I wasn't, after all, too late. Somebody pointed out the bird to me: just a speck in the distance, high over the valley. Through my scope, the speck grew wings. It looked pretty big—considering how far, far away it was. It was my lifer.

We discovered that the official Condor Watcher didn't really mind being bothered; upon inquiry, he told us that this was one of eight remaining wild condors. All of them had been captured and fitted with radio transmitters—which did, I have to admit, take away a little of the thrill. It didn't exactly make them zoo birds, but . . . . Still, it was a lifer.

I picked up a Condor Watch brochure with information on the birds' recent history, little of it hopeful. The dwindling number of birds—down from 15 the previous year and 19 the year before that—was bad news enough, but even worse, there was only one mated pair left: the Santa Barbara pair. At that very moment, the man at the lookout post told us, a Condor Watcher in an airplane was tracking the movements of this most rare and precious household. The birds were headed in our general direction, but they were miles away.

As the little band at The Sign watched the sky and listened to the muffled buzzing of the radio transmissions, our attention began to drift. A young couple noticed a yellow bird on the fence across the road and wondered what it was, so I turned my scope around and we all got a good view. I brought out a field guide to show them why it was a Cassin's kingbird and not the more common western. When I offered the book to the woman I suddenly noticed that she wasn't listening to me. She was staring over my shoulder; her eyes were wide and her mouth was just slightly open. I turned around to see what she was looking at.

Do you remember the moment toward the end of *Close Encounters of the Third Kind* when the scientists have been watching the swooping alien spaceships for 10 minutes, and then the lights disappear into the night sky, and somebody says, "That's all, folks," and Melinda Dillon hears a noise, and she looks back, and the Mother Ship is rising over Devil's Tower, and it's the biggest thing you've ever seen in your whole life?

The Santa Barbara female had flown up a valley beyond the road, out of our sight, and then banked over the ridge we were on, heading directly toward us, sailing with the wind, fast. I couldn't begin to guess her altitude, but she was low. She was so low that we just about snapped our necks when she passed overhead and kept going down the highway. I don't remember what we shouted to each other: exclamations, interjections, intensifiers—not much you could print.

There are those who think that dinosaurs didn't die out at all, that they transmuted into today's birds, and at that moment I would have believed them. The condor looked like a pterodactyl, looming over this baked landscape, searching for some luckless protolizard lunch. She was enormous. She looked like a B-52.

For the first, and so far only, time in my birding career, tears came to my eyes. The sight of this near-mythical creature, linked inextricably with what it represented, was overwhelming. The fact that I had been upset about the car and my worries about my life list suddenly were made trivial and ridiculous. Nothing mattered except that once these magnificent birds had ruled the sky, sacred creatures, Thunderbirds, and we had brought them to this: barely hanging on to existence, trapped, tagged, and numbered, counting the days until their death sentence would be carried out. The tears came partly from joy and awe, partly from sadness and anger.

I knew that great numbers of people, professionals and volunteers, were devoting time and energy to the condor recovery effort, doing everything possible to pull the species back from the brink. I knew that there had been controversy over taking birds and eggs from the wild for the captive-breeding program. And I immediately understood the viewpoint of the dissenters, the cranky traditionalists, those who said we should just leave the condors alone, to live and die with dignity, without all this high-tech meddling. I didn't belong here; the Condor Watchers didn't belong here; the transmitters and receivers and, for sure, that droning chase plane didn't belong here. This was not our world to manipulate. These birds deserved better than this.

It's a damn good thing I wasn't The One In Charge of Things then, or you wouldn't be reading this now. The human race seemed to me at that point an entirely superfluous presence on this planet.

Of course I've calmed down some now. There's probably a place for people here yet, I suppose. The relevant question is, Is there still a place for condors? Outside the San Diego Wild Animal Park and the Los Angeles Zoo, that is. The breeding program has been a bigger success than anybody dared hope a few years ago, and scientists plan to reintroduce condors into their native range soon. This time, they hope, the habitat will be a little safer: a little freer of poisoned predator traps, lunatics with guns—maybe even a little freer of scientists and bird watchers.

We condor watchers of that date—it was July 10, 1985—dispersed after our close encounter. I retained sufficient wits to be able to drive up Mount Pinos and find a couple more lifers: a male Allen's hummingbird performing his courtship flight, and a mountain quail shepherding two young birds right in front of me. I spent two more days in California, and then it was time to head home, with new entries for my bird notebooks, new stories to tell my outdoorsy friends.

Since that day I've seen some pretty amazing things in woods, swamps, and jungles, but none has had the kind of effect on me that the condors did. So if I ever happen to be in the room when you ask about All-Time Favorite Sightings, I may pretend to mull over a few runners-up, but there won't really be any question. In fact, at the moment I can think of only one thing that might rival it, and that hasn't even happened yet.

Someday, somebody is going to walk out to a cliffside hack site in the rugged mountains of Southern California. He or she will quietly remove the netting that surrounds the roost box, and the first California condor to be returned to the wild will be able to fly free. The great shadow will ripple across the desert, circle, and disappear. To be there at that nexus, at the exact point in time when an incompleteness is made complete, would be, I think, to feel the world change perceptibly.

But this event won't be staged for my benefit. What would I do if I were there? Salute, maybe, or quietly hum "God Bless America." No, my presence won't be required that day. Sometime later, though, I may go back to condor country, to imagine that a bird I see is a descendant of the Santa Barbara female, to turn to the birder next to me and say, "You know, this reminds me of the time . . . . " ■

Mel White is a freelance writer and Arkansas native. He hopes to finish the new American Birding Association Birder's Guide to Arkansas *sometime before the millenium.*

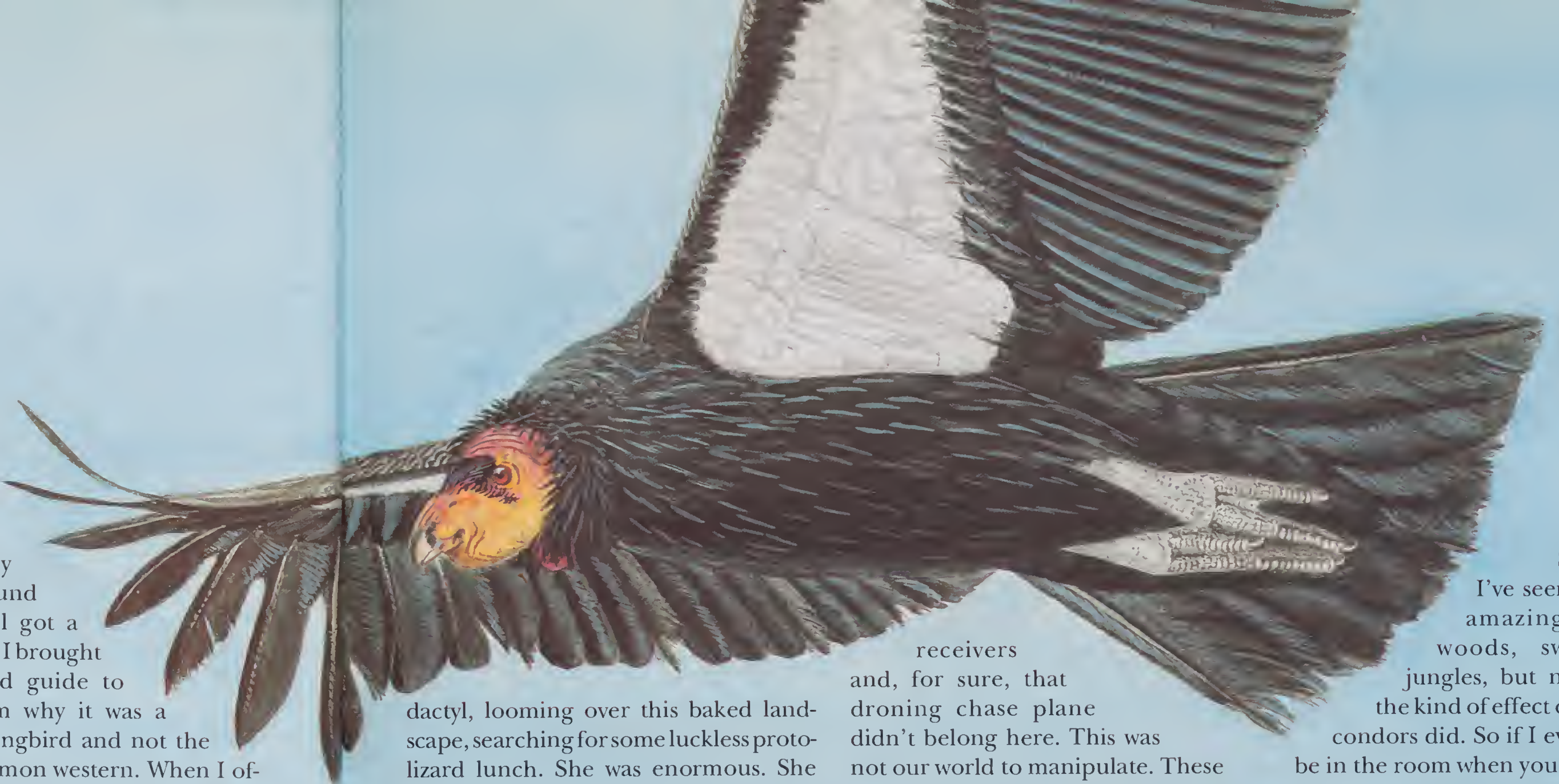

ILLUSTRATION BY JOHN SCHMITT

BHL

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COUNTING IN THE COLD

by Richard E. Bonney, Jr.

Quick! What's important about Freeport, Texas? If you don't know, not to worry, you're in good company. But if you do, then you're a bird numbers junkie. Because what puts Freeport on the ornithological map is the wonderful diversity of species found each winter on its Christmas Bird Count.

So productive is the fabled Freeport count that birders from around the continent journey to this Gulf Coast city to participate. The 1989–90 count, for example, involved 159 observers from points as distant as Arizona and Washington, D.C. They spent 409 party hours in the field, traveled 960 party miles, and tallied 170,524 individual birds of 226 species—the most species a North American Christmas Bird Count (CBC) has ever turned up.

If you've ever been on a CBC, you know exactly what I'm describing. You know how each holiday season, thousands of bird watchers throughout the Americas venture afield to count the kinds and numbers of birds present within hundreds of designated CBC circles. You know that each of the counts is conducted by an individual birding group, typically a bird club. You're aware that each group breaks into smaller teams and spends one day, sometime between December 15 and January 3, enumerating birds. You understand the strategy of a comprehensive route that will yield lots of birds of many species. You've probably attended a post-count compilation—a dish-to-pass dinner, perhaps, or even a banquet—where competitive spirit runs high and reports of rarities receive intensive scrutiny. And you probably had lots of fun.

You may not realize, however, the age of the tradition in which you've participated, or why it was begun. It's hard to believe, but the first CBC was held way back in 1900 at the instigation of Frank Chapman, then editor of *Bird-Lore* magazine, the forerunner of *Audubon*. Chapman concocted the count as an alternative to the traditional Christmas "side hunts" in which teams of hunters were formed to kill practically every animal that crossed their paths.

"*Bird-Lore* proposes a new kind of Christmas side hunt," Chapman wrote in the December 1900 issue, "in the form of a Christmas bird-census. We hope that all our readers who have the opportunity will aid us in making it a success by spending a portion of Christmas Day with the birds and sending a report of their 'hunt' to *Bird-Lore* before they retire that night. Such reports . . . will constitute, in a measure, a census of Christmas bird-life."

That first year a surprising 25 counts were held, involving 27 observers from 13 states and two Canadian provinces. Even so, Chapman would surely be astonished to learn how popular his counts have become. Nowadays nearly 1,600 CBCs are conducted each year, involving more than 42,000 observers from all the states and provinces, Central and South America, the West Indies, Guam, and Saipan.

No doubt Chapman would also be astounded at the present utility of CBC data. As you can imagine, thousands of observers counting birds in the same locations, Christmas after Christmas for several decades, have yielded a plethora of data about winter bird populations. And, because the results of each count have been faithfully published each year by the National Audubon Society, first in *Bird-Lore*, next in *Audubon Field Notes*, and most recently in *American Birds*, the numbers are available for anyone to examine.

As far as I'm aware, the first large-scale CBC analysis was undertaken by Leonard Wing of the State College of Washington. Back in 1943, Wing published a paper in *The Auk* in which he examined the spread of the European starling and the "English" sparrow throughout North America. Examining 40 years' worth of CBC data, he uncovered several theretofore unknown facts—for example, the sparrow spread throughout the continent much faster than the starling, taking just 40 years to complete its New World invasion.

During the next three decades several other researchers used CBC data for a variety of other studies, mostly examinations of the abundance or distribution of birds in individual states or regions. W. H. Brown, for example, published "Population changes in the red-shouldered and red-tailed hawks" in *Iowa Bird Life* in 1964.

By the early 1970s, however, ornithologists were realizing that the thousands and thousands of published CBCs represented a terribly underused wealth of information on the abundance, distribution, and long-term population trends of birds throughout much of North America. Among these ornithologists was Carl Bock of the University of Colorado, who took the CBC bull by the horns and began analyzing the data upside down and backwards. His first CBC analysis was an examination of counts in Colorado. Among the findings: winter populations of red-breasted nuthatches and red crossbills, which ornithologists had known to fluctuate widely from year to year, actually fluctuated in synchrony with each other. "The birds could be migrating into Colorado when cone crops there are good, or when they have failed in other areas," he and coauthor Rozella Smith speculated in *American Birds* in 1971.

During the next 15 years, Bock and his colleagues published at least two dozen more CBC analyses, on subjects as general as "Winter patterns of bird species diversity and abundance in the United States and southern Canada" and as specific as "Changing winter distribution and abundance of the blue jay." His most recent analysis, "Abundance relationships of some Arizona landbirds: A matter of scale?" was published in *Ecology* in 1987.

Back toward the beginning of Bock's publishing marathon, I got involved in a CBC analysis myself. At that time several researchers were still wondering about the validity of the data—that is, do CBCs truly provide a measure of winter bird populations, or do they simply tell us about the numbers of birds seen on one day near Christmas? My study was intended in part to shed some light on that question.

What began as an alternative to hunting has become a wealth of scientific information

It began in the fall of 1975, when I was enrolled in Cornell University's ornithology course under the tutelage of Tom Cade, director of The Peregrine Fund. For my class project, Tom suggested that I examine CBC data from 1940 to 1975 to see if it would reveal meaningful information about the abundance and distribution of the peregrine falcon. When he proposed the project, it seemed simple. We already knew that peregrines were declining, victims of pesticide poisoning. Would CBC data corroborate what other counts had already told us?

I soon learned why so few researchers had attempted to analyze CBCs. Gathering the information I needed was tedious and boring. I had to dig through year after year of the Audubon Society's CBC magazines and read every count, searching each listing for the number of peregrines seen—which usually was zero. To this day, anytime someone mentions the Christmas Count, my immediate recollection is not of great birding experiences but of dusty library carrels, endless cups of coffee, and trip after trip to the pencil sharpener. But after a few months of eyestraining labor and a few statistical tests, I finally completed the ordeal. And guess what? The data did show a clear decline for every region in which peregrines are present in winter.

"Results from this CBC analysis confirm previous reports that eastern North American peregrine falcon populations have declined severely over all parts of their range," I concluded in *American Birds* in 1979. "Perhaps more CBC data could be analyzed to detect thus far unnoticed, possibly dangerous, trends in other species."

Before such analyses could be conducted, however, the data really needed to be computerized. Enter the Cornell Lab of Ornithology. In 1984, with the help of a gift from Lab member George Knight, the Lab's Bird Population Studies program began keypunching all CBC data from 1957 to the present. In 1987 the job was completed, so it's now easy for Lab biologists to determine 30-year population trends.

And determine trends they have. Regular readers of the Lab's newsletter, *Birdscope*, will recall a recent CBC analysis by Gregory S. Butcher, director of Bird Population Studies, which identified seven species showing particularly severe population declines. These include the spotted owl and snowy plover, whose regressions were old news for many biologists, as well as the vermilion flycatcher, which has been declining a surprising 4.3 percent a year for the past 20 years. This is exactly the kind of information needed by wildlife management agencies such as the U.S. Fish and Wildlife Service for setting conservation priorities.

And so, what began as an alternative to hunting and evolved into the birder's social event of the year has also become a wealth of scientific information that continues to be mined. Why not join the effort? You don't need to go to Texas: wherever you live, there's almost certainly a Christmas Bird Count nearby. Ring in the new year with a fun count for science! ■

For more information on the Christmas Bird Count contact your local bird club or write to: CBC editor, American Birds, *National Audubon Society, 950 Third Avenue, New York, New York 10022.*

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CANARIES

IN THE

GLOBAL MINE

by Paul R. Ehrlich

Songbird declines may signal trouble ahead for the human race

In the old days, coal miners took caged canaries down into the mine shafts with them. The birds served as an early warning system, alerting the miners to the presence of deadly methane gas. Because of their high metabolic rates, birds are much more sensitive than human beings to the gas. Whenever a canary had difficulty breathing or showed other signs of distress, the workers left the mine immediately. Today many bird populations around the world are plummeting in response to a rapidly degrading global environment. And some species have already been driven to extinction. Could it be that the world's birds are acting like a miner's canary, collectively warning us about the dangerous state of our own global "mine?"

ILLUSTRATION BY STEVE CARVER

The Earth's rich array of plants, animals, and microorganisms is under an assault unprecedented in the last 65 million years. Thousands of species and millions of populations are disappearing annually. Among the latter are many bird populations. Since birds are more closely studied than any comparable group of animals, they serve as our best indicator of the state of natural ecosystems.

The plight of neotropical migrants—North American songbirds that migrate to and from Latin America—is now gaining attention in this country. Researchers believe that the populations of many neotropical migrants have been cut roughly in half during the past few decades and that the decline is likely to continue. There are two basic reasons for this. The first is forest fragmentation—the breaking up of continuous woodlands, which creates a patchwork of woods, fields, and edge habitat that is especially congenial to enemies of songbird nests ranging from brown-headed cowbirds and blue jays to raccoons and cats. The second reason is habitat destruction, both here and in the tropical rainforests that some species depend on for winter homes.

Bird species around the world are being nickeled and dimed to death as an exploding human population occupies their habitats and consumes or degrades their resources.

Behind both trends are potent forces that make the extinction of birds and other organisms inevitable: the explosive growth of the human population; expansion of per capita consumption; and the use of environmentally destructive technologies to support that consumption. Approximately a quarter of a billion people now live in the United States—perhaps 150 million more than the country's life support system can support for the long term with a reasonable lifestyle. As a nation, we should strive for a sustainable population, one that can be maintained for thousands of years, rather than trying to cram in as many people as possible over a few decades until the nation collapses in chaos.

Overpopulation in the United States, coupled with a pathetic lack of attention to land-use planning, control of toxic substances, protection of groundwater, and other environmental follies, is tightly tied to habitat destruction and degradation that makes survival difficult for many bird species. As a result of such habitat loss, the ivory-billed woodpecker has already vanished and the Bachman's warbler and other species are threatened.

But migrant songbirds are not alone in signaling the deterioration of North America's natural environment. Some loon populations are fading, apparently as a result of the effects of acid rain on fish numbers; the birds simply can't find enough fish to feed their young. Black ducks may be vanishing for the same reason. I have been saddened by the sight of herons "panhandling" for fish in Florida. According to Audubon scientist George Powell, the only way the birds can get enough food to raise their young is by begging from human beings. Something has changed the Florida Bay ecosystem so that it no longer sustains the herons.

The effects of drought and the plowing under of prairie potholes have reduced North American waterfowl populations by 25 percent in the last three decades. Urban growth and conversion of meadowlands, hayfields, and pastures to crop growing in the Midwest are seriously affecting the barn owl, one of the most widespread of all birds.

Destruction of old growth forests in the Pacific Northwest—partly inspired by "junk bond" financing of lumber company takeovers—threatens the spotted owl, the marbled murrelet, and also the people who depend on sustainable forestry for their livelihood.

California's Kesterson National Wildlife Refuge and Nevada's Stillwater Wildlife Management Area have an epidemic of deformed waterfowl. Birds with protruding brains, corkscrew beaks, and missing eyes bear grim testimony to the buildup of toxic substances in their environment—the result of irrigation runoff. Public health officials have cautioned children, pregnant women, and nursing mothers not to eat coots from the Tulare Basin. And in 1988, selenium levels in San Francisco Bay were so high that the Fish and Game Department issued warnings against eating certain ducks.

The situation in Europe is similar. Intensified farming there has extirpated many bird populations. And while some raptor populations have bounced back after suffering declines related to eggshell thinning caused by DDT and other persistent chemicals, there is now disturbing news of eggshell thinning associated with acid rain.

Bird species around the world are being nickeled and dimed to death as an exploding human population occupies their habitats and consumes or degrades their resources. The number of people in the world has doubled since 1950, and their impact on the Earth's life-support systems has quadrupled in that time. Humanity now uses, co-opts, or destroys roughly 40 percent of the food available to all other land animals.

So it is not surprising that a 1988 report by the International Council for Bird Preservation estimated that 10 percent of the world's bird species are endangered—more than three times as many as they had previously estimated. Africa's list of endangered birds has risen from 65 to 170, while Brazil's has gone from 29 to 121 species (64 of them in the rapidly dwindling coastal rainforest north of Rio de Janeiro). Indonesia's endangered bird list has rocketed from 14 to 126.

In southern and eastern Asia, the majority of natural wetlands are under threat, largely because of the necessity of feeding 55 million additional people each year—the population equivalent of a new Thailand annually. Coastal wetlands are drained and converted to farmland; mangroves and swamp forests are cleared to provide aquaculture ponds and timber. As a result, waterbirds are in trouble. All five threatened stork species, four of the six threatened ibises and spoonbills, and four of the seven threatened herons are Asian.

Should anyone besides birders care? Only if they like living. Remember, birds serve as indicators of environmental health just as those canaries served the miners long ago.

But should anyone besides birders care? Only if they like living. Remember, birds serve as indicators of environmental health just as those canaries served the miners long ago. Civilization depends upon the free "public service" functions that natural ecosystems perform. These include regulation of atmospheric gases, moderation of the weather, control of the hydrologic cycle (including flood and drought prevention), the generation and maintenance of soils and recycling of nutrients critical to agriculture and forestry, suppression of the vast majority of potential crop pests and disease carriers, pollination of many crops, provision of food from the sea, and maintenance of nature's vast "genetic library." The latter has already provided humanity with the very basis of civilization in the form of crops, domestic animals, medicines, building materials, and industrial products, and is the sole source of raw material for genetic engineering.

These services are already faltering around the globe as forests disappear (leading to global warming), soils erode at high rates under the pressure of industrial farming, wetland loss removes critical systems upon which many oceanic fisheries depend, pesticides disrupt natural pest-management functions, and toxins seep into aquifers. And the world's avifauna tells us about it by fading away at an ever-quickening pace.

So the birds are serving as global miners' canaries, giving us a clear signal that humanity is getting into deeper and deeper trouble. Since there is no way to flee our "mine," we'd better start reducing our impact on the planet. That means stopping our population growth and starting a gradual reduction in human numbers, becoming much less wasteful with our natural resources, and selecting technologies with their environmental impact as a prime consideration.

Saving ourselves will involve a level of effort at least as great as that put into military security over the past 40 years. It is an effort that we must all join by educating ourselves, changing our lifestyles, and supporting environmentally active organizations such as Zero Population Growth, the Sierra Club, Environmental Defense Fund, National Audubon Society, and the Cornell Laboratory of Ornithology. Above all, we must become politically active in defense of the environment. The penalties for failing in this effort will be far worse than simply having to restrict our birding to starlings and house sparrows. Failure will mean barring our grandchildren from enjoying a quality of life even remotely resembling our own—that is, if they have any life at all. ■

Paul R. Ehrlich is Bing Professor of Population Studies at Stanford University and coauthor of The Birder's Handbook *(Simon and Schuster, 1988). His most recent book, written with his wife Anne, is* The Population Explosion *(Simon and Schuster, 1990).*

Albatross: Bird of Mystery and Myth

How the albatross got its bad rap

by Julie Ridl

Photographs by Frans Lanting

BHL

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JULY 1959—On a routine trip from the Antarctic to Norway, the cargo ship Calpean Star *is beset by misfortune—bad weather, dangerous seas, a malfunctioning engine. After a harrowing voyage the ship is forced to dock in Liverpool, England, for repairs. Among the cargo on the* Calpean Star *is an albatross, headed for a zoo in Germany. The crew members are sure that the bird is the source of their bad luck. When it dies a day later, 50 crewmen stage a strike, refusing to continue the voyage and demanding their pay at once.*

To this day many people, seafarers and landlubbers alike, continue to think of the albatross as a creature of ill omen and portent—a bird with the ability to raise up mighty gales or, conversely, to leave sailors stranded with empty sails on a becalmed sea. Amazing to think that these superstitions hang on so tenaciously in the modern age. But how did this bird of mystery get its evil reputation? And how long has it had to carry *that* albatross around its neck?

According to author William Jameson, himself a seafarer in the Royal Navy, the superstitions associated with albatrosses are actually a relatively new phenomenon. In researching his book, *The Wandering Albatross*, he could not find any references to albatross superstitions earlier than the 18th century.

Jameson and several others believe that the albatross's bad press, its reputation for bringing bad luck, can be traced directly to a diary written by the captain of an 18th-century British vessel, the *Speedwell*. The ship left England on February 13, 1719, setting sail on a round-the-world journey by way of the South Seas. While rounding Cape Horn eight months later, the *Speedwell* met with terrible weather, all spit, gloom, and clouds.

"One would imagine it impossible that any living thing could subsist in so rigid a climate," wrote Captain George Shelvocke as his ship braved the raging tempest. "We had not a sight of . . . one seabird, excepting a disconsolate black albitross [*sic*], who accompanied us for several days, and hovered about us as if he had lost himself, till Hatley (my second captain) concluding, in a gloomy fit, that the company of this melancholy bird brought us ill luck; resolved to destroy him in hopes we might then have better weather, and more favourable winds than we had hitherto had to deal with in these remote, tempestuous seas."

Hatley shot the bird, bringing no immediate change in the weather, and the *Speedwell* sailed on through the storm. Shelvocke made no further reference to the bird or to any effect its death had on the ship or its inhabitants.

Hatley's conclusion that the albatross had brought the foul winds was unusual. Though sailors were wary of other seafaring birds, such as storm-petrels, which they believed embodied the souls of drowned seamen, the albatross apparently had no special supernatural associations at that time. Indeed, researchers have scoured early books, archives, and ships' logs without finding any mention of albatross superstitions predating Shelvocke's voyage. So it looks as if the albatross can thank First Mate Hatley for starting the bird down the long road to mythic stardom. But it took the tortured imagination of famed Romantic poet Samuel Taylor Coleridge to transform Hatley's fear into folk legend some 80 years later.

In 1797, Coleridge was vacationing with William Wordsworth and his sister, Dorothy, in the Quantock Hills of England. The two men were scrambling to find ideas for a poem they could sell to add funds to their traveling kitty. Wordsworth recalled reading Shelvocke's published diaries, including the account of the menacing black albatross. He also remembered a friend's Flying Dutchman-like dream of a phantom ship crewed by skeletons.

This was just the kind of material Coleridge needed to inspire him. Armed with Wordsworth's ideas and an extravagant imagination (fueled by liberal doses of laudanum, an opium-alcohol solution), Coleridge wrote *The Rime of the Ancient Mariner*, the classic poem that would seal forever the ominous reputation of the albatross.

The poem was first published in the *Lyrical Ballads* (1798), a collection that Coleridge coauthored with Wordsworth. After the poem's publication, records of superstitions and supernatural notions surrounding the albatross began to appear.

It's not surprising what an impact the poem had on the people of the time, considering the power of the narrative. In the first lines we are introduced to the hero—a disturbed and disturbing mariner who serves as narrator of the tale-within-a-tale. He corners a guest at a wedding and relates his gruesome story.

A long time before, while the mariner was still a young man, his ship had set sail for the Cape, where it met with storms, treacherous winds, and ice. An albatross sailed through the fog to follow the ship. The sailors fed and befriended the bird. Suddenly the ice split, allowing the ship to pass, and a strong south wind billowed its sails.

But in a wanton moment, the foolish mariner pulled his bow and killed the bird. The act angered a polar spirit, who avenged the bird's death by becalming the ship. The crew, certain that the mariner's act was the cause of their undoing, shunned him and forced him to hang the dead albatross from his neck to atone for his sin.

After much suffering and starvation, a ghostly visitation brought death for the crew and condem-

And I had done a hellish thing,
And it would work 'em woe:
For all averred, I had killed the bird
That made the breeze to blow.

— Samuel Taylor Coleridge

Whether you believe in the superstitions connected with this bird or not, a soaring albatross (above left) is an awe-inspiring sight. Perhaps the bizarre courtship behavior of albatrosses (above right) helped make them ripe candidates for mythologizing.

nation for the mariner, who had to live on, sailing the seas surrounded by a ghastly crew of dead seamen.

When the mariner finally repented his crime, a heavenly host interceded, and supernatural powers carried his ship home. But the ancient mariner's lifelong penance is to teach others the lesson he learned: "He prayeth well, who loveth well/Both man and bird and beast."

The poem presents a complex interplay of supernatural beings. Scholars representing numerous schools of literary criticism have written volume after volume in which they work to decipher the symbolism of Coleridge's albatross. In *Reality's Dark Dream, Dejection in Coleridge,* Beverly Fields takes a psychoanalytic approach, relating the imagery of the dead bird to Coleridge's own uncertain sexuality. She cites the dead white bird as a symbol of mother-incest, of impotence by castration, of patricide—poor bird!

Esoteric arguments aside, the poem has had a measurable impact on folk culture. And the potency of Coleridge's masterpiece may also have been a compelling factor in the protection of the albatross family. Before the late 18th century, the 13 albatross species (scattered predominantly in the southern oceans) were prime targets for commercial harvest and sport hunting. Whole colonies were destroyed by sea-going entrepreneurs to supply European milliners and bedding manufacturers. There were many other uses for albatross body parts—the birds' webbed feet made intriguing tobacco pouches; wing bones were transformed into pipe stems; breasts made interesting muffs; and beaks could be made into unusual-looking paper clips. There was also the old sport of albatross fishing, in which sharp treble hooks baited with fat were used to lure the birds. Hauling in one of these gargantuan birds on a line was more challenging than catching most sportfish, often requiring two or more people to land one.

Then along came *The Rime of the Ancient Mariner.* Hunting dwindled and fear spread. In the 20th century, protective legislation for albatrosses became more widespread. In 1909, Theodore Roosevelt reserved Laysan and its neighboring islands for breeding albatrosses. The superstition born of Hatley and fostered by Coleridge may have ensured that there were still enough albatrosses left to protect.

But the bringing of ill winds and bad luck are not the only supernatural powers that have been attributed to the albatross over the years. Some people contend that the bird has at times been regarded as a good sign—a harbinger of favorable winds, a portent of ships arriving at harbor, a friend to lonely sailors. Seeing these beautiful long-winged creatures (the wandering albatross has an average wingspan of 10 feet) display their dynamic flying abilities on a windless day must have given hope of coming winds to becalmed sailors. As with most myths associated with living things, there is a grain of truth to some of the supposedly supernatural qualities associated with the albatross. The belief widely held by seaside dwellers that an albatross near land signals the arrival of ships at port is fairly reliable. Severe oceanic storms will often drive the huge birds toward land. These same storms bring ships looking for safe harbor.

Another bird superstition may have had an influence on subsequent albatross myths. Many early seafarers believed that gulls and storm-petrels embodied the restless souls of dead mariners—most probably the spirits of captains who had sailed in comfort all their lives. These lost souls were condemned to wander eternally in the harsh southern seas as penance for the conditions they had forced upon their crews in life. (Sailors have always been creative with their superstitions.)

In the 18th century, noted taxonomist Carolus Linnaeus may have connected these superstitions through his choice of a name for the albatross family: Diomedeidae. In Greek mythology, Diomede, king of Argos, hero at Troy, crossed the path of a powerful magician. The magician turned Diomede's companions into birds. But Diomede's friends were transformed into swanlike birds, not gulls or storm-petrels or soaring albatrosses. Whether the sailor-to-bird superstition was initiated before or because of Linnaeus's naming is not known. But to superstitious people,transmogrification would certainly explain a lot about the eerie behavior of these birds.

Granted, the folk record is unclear and incomplete, but it seems that the albatross's bad reputation began with one trigger-happy first mate, was expanded and popularized by a troubled Romantic poet, and is now tightly woven into our cultural fabric. ■

Julie Ridl is a freelance writer based in Holland, Michigan, far from any albatrosses. She is the former managing editor of Birder's World *magazine.*

BHL

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BIRDING BY THE BOTTLE

by Peter Stangel

A connoisseur's guide to wine cellar bird watching

Birders are listers, no two ways about it. Life lists, year lists, big-day lists, country and continent lists; the lists go on and on. And for good reason: listing stokes our competitive fires, adding to the challenge and excitement of birding.

Over the years, my own lists have gone from the routine to the unusual. For example, I haven't updated my state list in ages, but I actively keep track of the species I see during morning bike rides. My life list is badly neglected, but my list of birds seen or heard at the movies grows steadily. My friends kid me that these nontraditional lists reflect a shortened attention span associated with advancing age, but I prefer to think that they are a way to add pleasure to everyday activities. If you have to ride the train to work every morning, why not make it an adventure in bird listing?

My latest list is proving to be the most pleasurable of all, because it combines two of my favorite things: birds and wine. It all started on a recent business trip to San Francisco, when I ducked into one of the many superbly stocked wine cellars near Fisherman's Wharf. I had just graduated from a wine-tasting course at the local community college back home (with honors!) so I was eager to test my skills with the Bay Area experts.

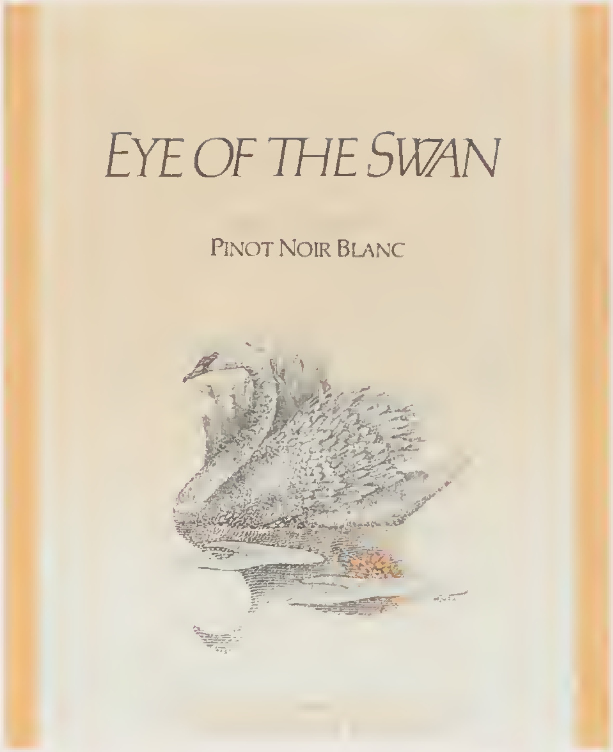
As I gazed on row after row of the local varietals, something caught my eye. It was a peregrine falcon. Yes, a peregrine falcon, right there on the label of the Hawk Crest 1986 California Cabernet Sauvignon bottled by Stag's Leap Wine Cellars of Napa Valley. I admired the fine black-and-white-drawing, took a bottle for future reference, and started to move toward the cashier when . . . wait a minute, I thought, those can't be passenger pigeons! But they were, painted by John James Audubon and gracing the label of an Audubon Cellars 1984 San Luis Obispo County Zinfandel. This seemed too good to be true—beautiful birds *and* fine wines.

TIM GALLAGHER

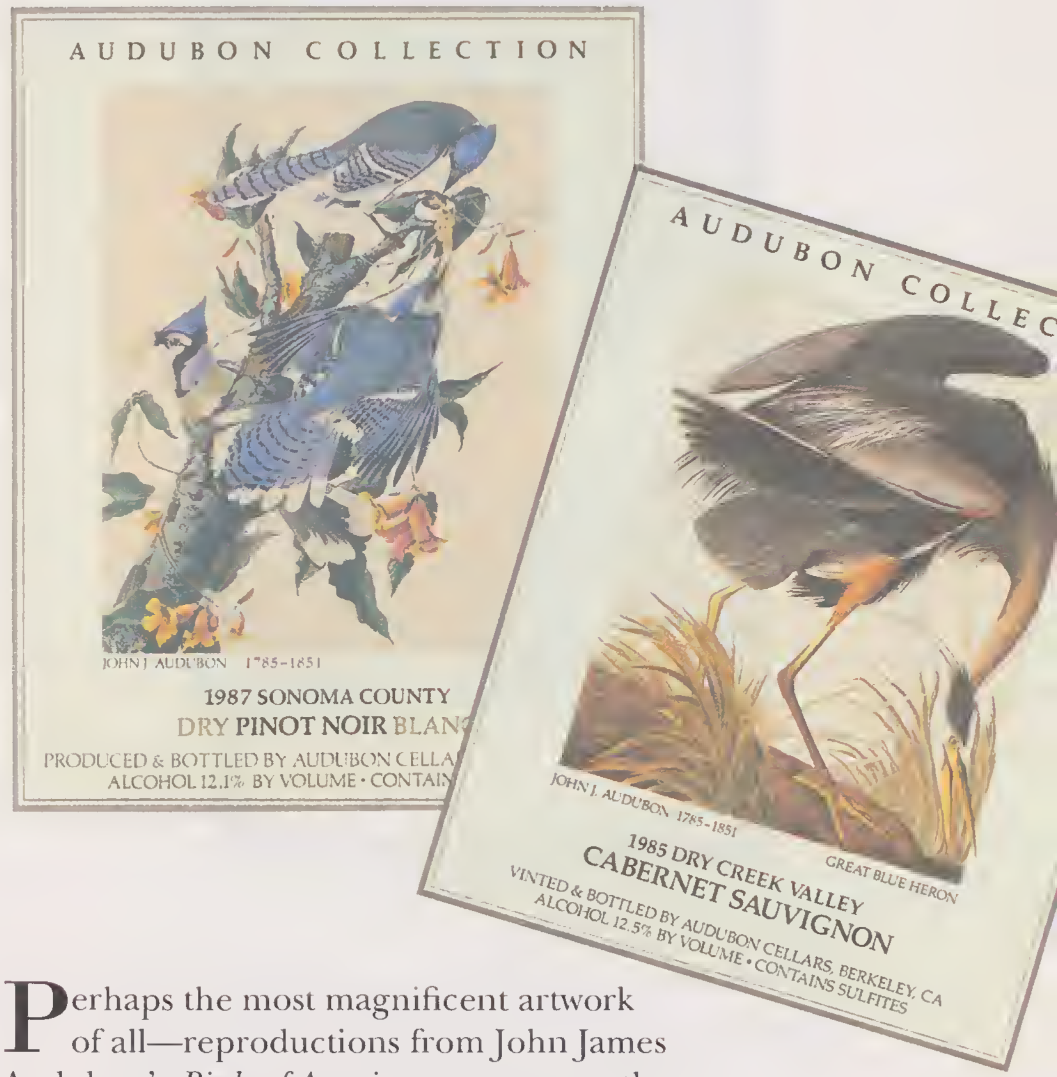
As I continued to explore the cellar, I was struck by the variety of birds used to illustrate wine labels, and by the superior artistry of the illustrations themselves. I wondered why so many vintners had chosen birds to represent their wines. Were they birders, like me—or were they just trying to appeal to bird watchers? Clearly these vintners recognized that birds and fine wines are a natural combination. I decided to search out the stories behind the labels, and I set out to ask these vintners about their interest in birds and wine. The results of my quest are presented on the following pages.

I find constructing lists from an unusual source both pleasurable and educational. The identifications can be challenging: the Lady Amherst pheasant on a Pinot Grigio from Italy had me stumped for quite a while. And the fieldwork is invigorating: do you have any idea how many private labels there are to be investigated? My wine label life list is fast approaching 25 species, with no end in sight. Armed with a corkscrew and a keen sense of adventure, I've recommitted myself to the joys of listing. ■

Peter Stangel is director of the Neotropical Migratory Bird Conservation Program at the National Fish and Wildlife Foundation in Washington, D.C. Stangel and coauthor Michael Lennart wrote for us about the endangered red-cockaded woodpecker in the Autumn 1989 issue of this magazine.

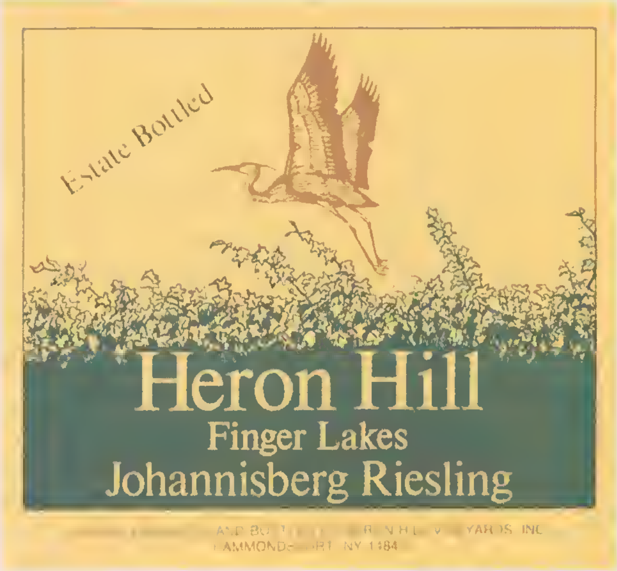

EYE OF THE SWAN
PINOT NOIR BLANC

Sebastiani Vineyards of Sonoma Valley features the black swan of Australia on the label of its Pinot Noir Blanc. The pinkish blush of this wine reminded August Sebastiani, the vineyard's founder, of the reddish hue of the black swan's pupil. It's not surprising that Sebastiani would be aware of such detail. He has been hooked on birds since the time when, at age 12, he hand-reared two mourning dove chicks that had fallen from their nest. Sebastiani's interest in aviculture blossomed, and he soon acquired one of the world's largest private collections of doves. One of his greatest thrills came on the day that a prominent ornithologist visited his aviary. "My God, August, do you know what you have here?" the ornithologist exclaimed. "These birds are thought to be extinct!" As it turns out, Sebastiani's 12 Socorro doves were once native to an island off the Pacific coast of Mexico. Sebastiani had known they were unusual, but he hadn't known exactly what they were. With the help of a few other dedicated enthusiasts, Sebastiani hopes eventually to reintroduce the rare species to its native habitat.

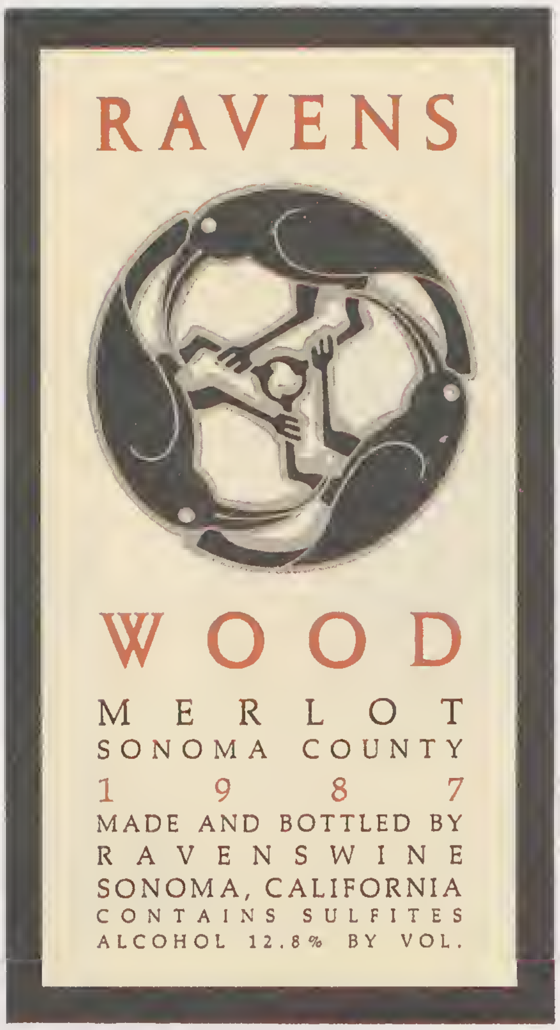

AUDUBON COLLECTION
JOHN J. AUDUBON 1785–1851
1987 SONOMA COUNTY
DRY PINOT NOIR BLAN
PRODUCED & BOTTLED BY AUDUBON CELLA
ALCOHOL 12.1% BY VOLUME • CONTAIN
AUDUBON COLLEC
JOHN J. AUDUBON 1785–1851
GREAT BLUE HERON
1985 DRY CREEK VALLEY
CABERNET SAUVIGNON
VINTED & BOTTLED BY AUDUBON CELLARS, BERKELEY, CA
ALCOHOL 12.5% BY VOLUME • CONTAINS SULFITES

Perhaps the most magnificent artwork of all—reproductions from John James Audubon's *Birds of America*—appears on the labels from Audubon Cellars of Berkeley, California. The idea of using Audubon's birds was conceived by Hubertus von Wulffen, president of the former Montali Winery. Faced with poor consumer recognition of his products, von Wulffen felt Audubon's watercolors would create a unique marketing niche and increase public access to the beautiful artwork. With assistance from the National Audubon Society, von Wulffen introduced the labels in 1986.

The marketing strategy has been successful. Not only have sales increased, but von Wulffen has been able to make substantial contributions to support the conservation efforts of the National Audubon Society.

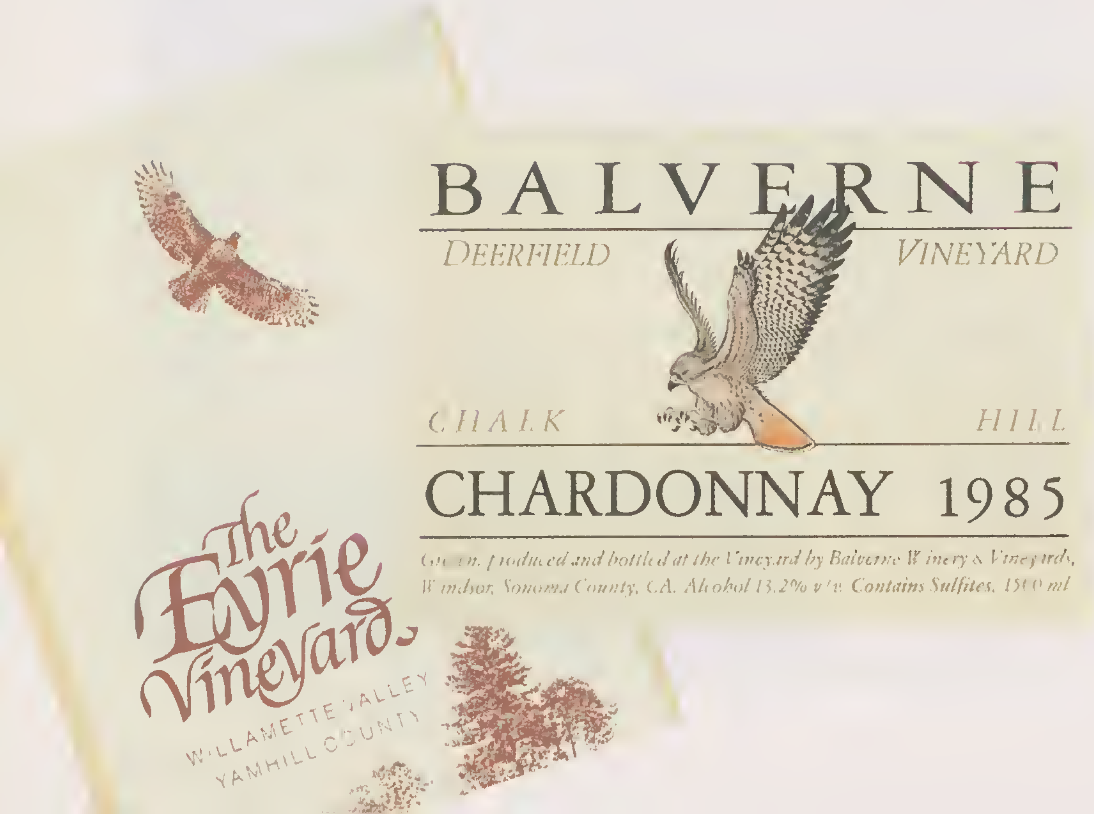

Estate Bottled
Heron Hill
Finger Lakes
Johannisberg Riesling
HAMMONDSPORT, NY 14840

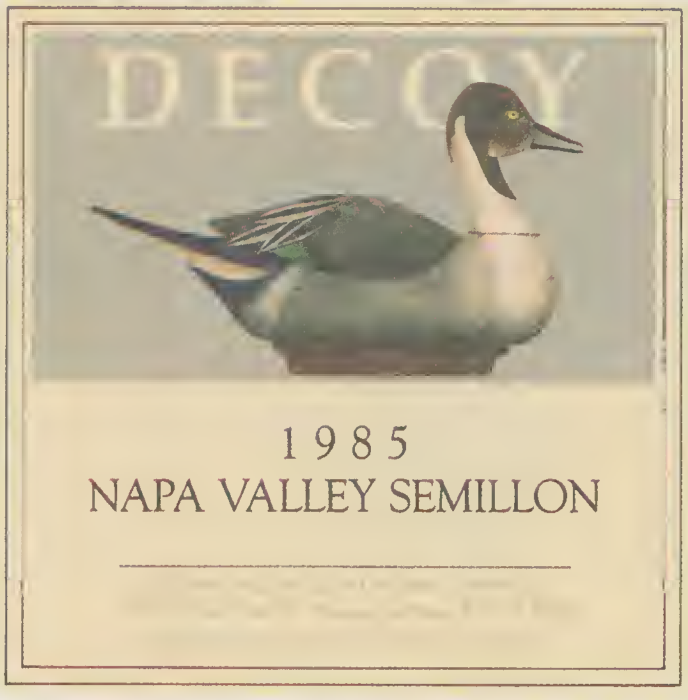
Peter Johnstone of Heron Hill Winery in Hammondsport, New York, wanted a label for his wines that would be a match for their distinctive flavor. After considering a number of birds and mammals of the Northeast, he chose the great blue herons that frequent the shores of Keuka Lake, where the winery is located. No argument from us bird watchers on the visual appeal of this label!


RAVENS
WOOD
MERLOT
SONOMA COUNTY
1987
MADE AND BOTTLED BY
RAVENSWINE
SONOMA, CALIFORNIA
CONTAINS SULFITES
ALCOHOL 12.8% BY VOL.

My vote for the most unusual label goes to Ravenswood Vineyard of Sonoma, California. The stylized drawing of three ravens is by David Goines, one of the most influential commercial poster artists in the United States.

The origins of the Ravenswood Vineyard name are complex. In Native American myth the raven is hailed for its ability to survive in extreme conditions. The vineyard's founder, Joe Peterson, noticed ravens in his vineyard while he picked his first grapes in 1976, and thought the birds symbolized his efforts. The name Ravenswood itself is taken from the hero Lord Ravenswood in *Lucia di Lammermoor*, an opera by Donizetti based on the Gothic novel by Sir Walter Scott. Who says bird watching isn't a cultural activity?


BALVERNE
DEERFIELD
VINEYARD
CHALK
HILL
CHARDONNAY 1985
Grown, produced and bottled at the Vineyard by Balverne Winery & Vineyards, Windsor, Sonoma County, CA. Alcohol 13.2% v/v. Contains Sulfites. 1500 ml
The Eyrie Vineyards
WILLAMETTE VALLEY
YAMHILL COUNTY

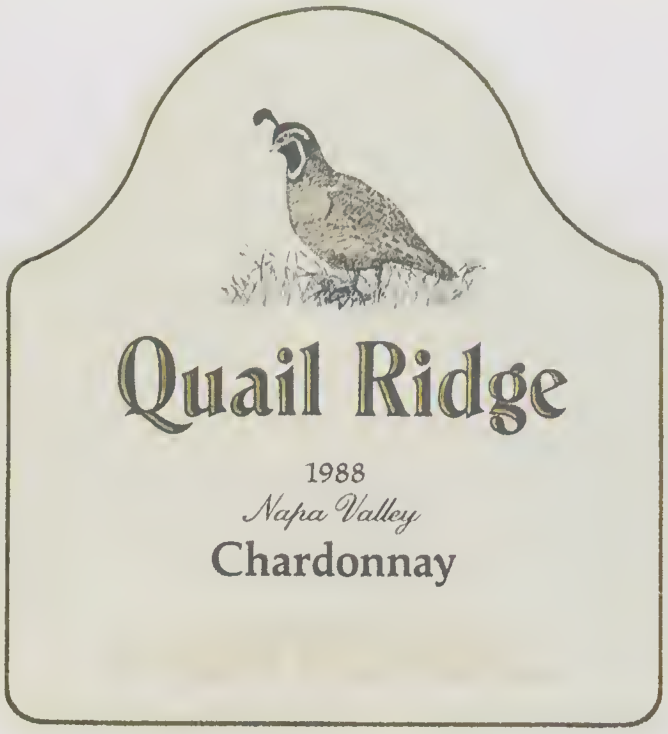

DECOY
1985
NAPA VALLEY SEMILLON

Waterfowl decorate the labels of wines from Duckhorn Vineyards in St. Helena, California. The Duckhorn family, whose name is Anglicized from the Austrian Duc Horn, manages the vineyard and is one of 10 families sharing ownership.

The Duckhorns are avid sportsmen and keen supporters of waterfowl conservation in Northern California. They chose a French lithograph of a mallard to represent their Merlot. Even more striking is a magnificent rendering of a pintail decoy by local artist Dave Huddleston. The decoy label appears only occasionally, when an excess of the Napa Valley Semillon varietal is produced.

A soaring red-tailed hawk represents Eyrie Vineyards, nestled in the Red Hills of Dundee, Oregon. Owners Mr. and Mrs. David Lett recall that as they planted their first few acres of grapes, they noticed a red-tail nest in the vineyard's lone fir tree. The Letts, self-confessed hawk worshipers, felt a special kinship with the raptors and decided to name the vineyard after the hawks' home.

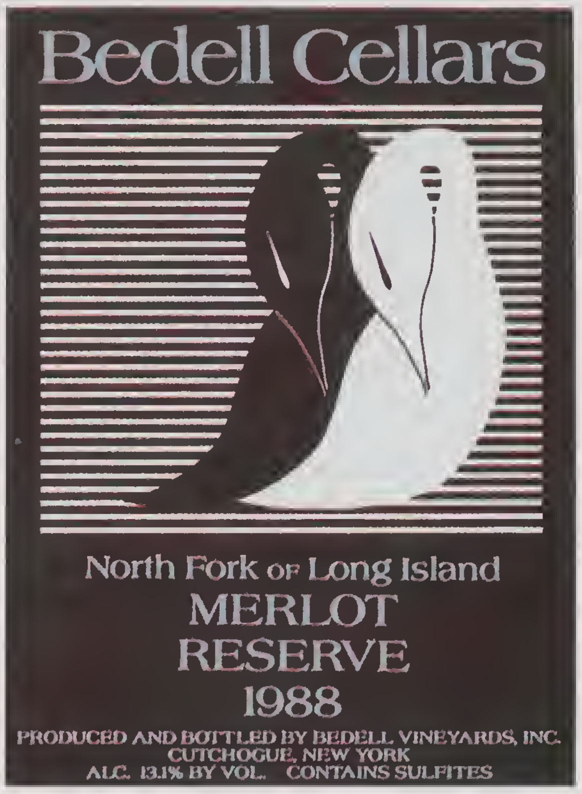
A red-tailed hawk also graces the labels of wines produced by the Balverne Winery and Vineyard of Windsor, California. With its wings swept back and talons outstretched, this red-tail seems poised to capture some unsuspecting vineyard vermin. In fact, workers at Balverne welcome the red-tails because they frighten away the starlings that prey on ripening grapes.


Quail Ridge
1988
Napa Valley
Chardonnay

Once upon a time, a lady quail in distress sought refuge on the hilltop lawn of an amateur winemaker. The winemaker, being English and fond of animals, cared for the lady quail and her retinue. The quail found the food plentiful and the ambience delightful, so they took up residence.

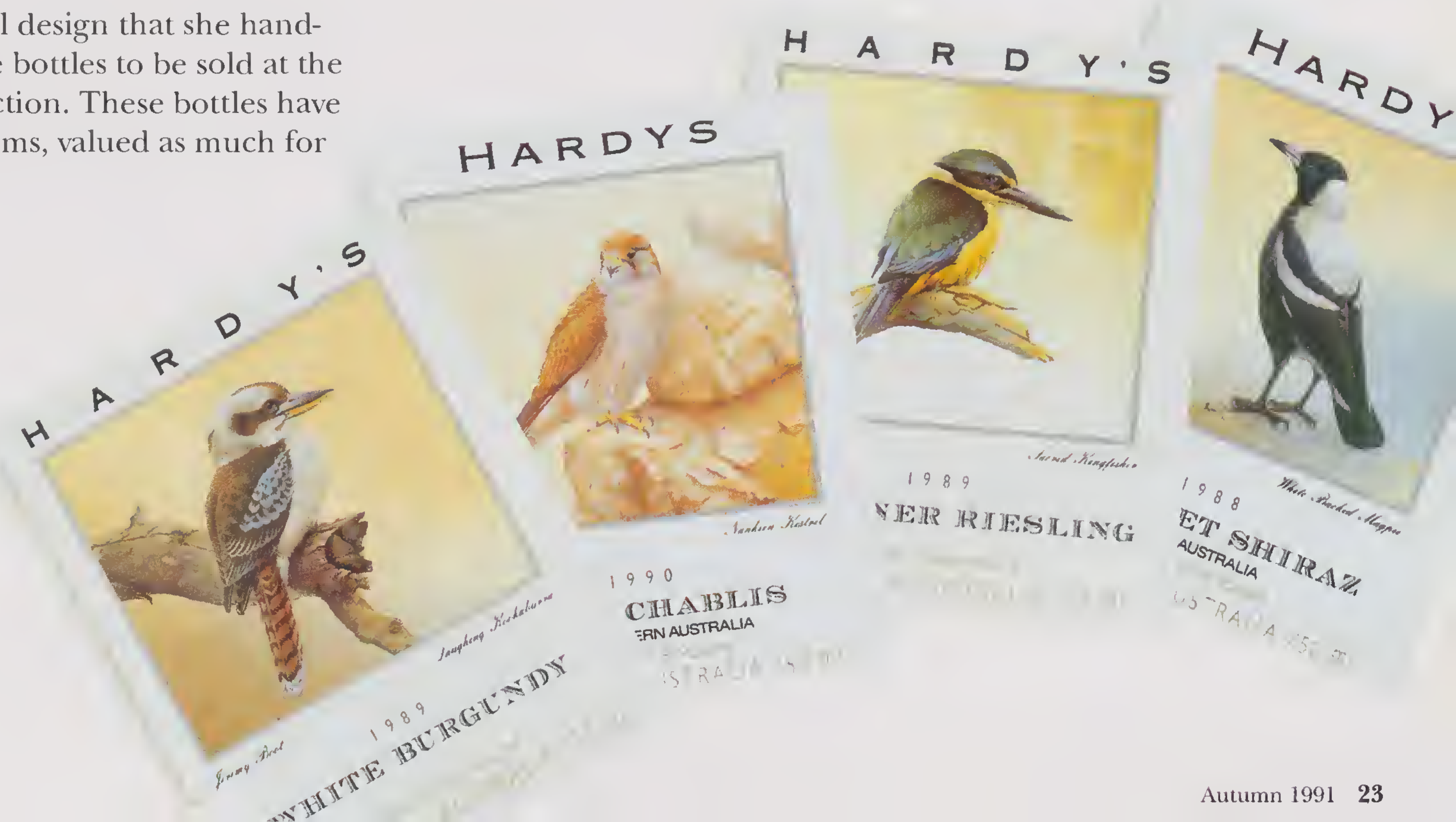
One day the winemaker was visited by a wine critic who asked for a few unlabeled bottles of her Chardonnay and Cabernet Sauvignon. The critic took the wines and entered them in the Best of California competition, where they took top honors. A telephone call notified the winemaker of her success; as the bottles had no labels, she was asked the name of her winery. Flabbergasted, she looked out the window. Outside on the lawn, the quails preened and scratched as the sun set below the hilltop. “Quail Ridge!” the excited winemaker gasped. And so Quail Ridge was named.

The colorful label is painted by Laura Corallo-Titus. Each year, Corallo-Titus also creates a fanciful quail design that she hand-paints onto large wine bottles to be sold at the Napa Valley Wine Auction. These bottles have become collector’s items, valued as much for their art as their wine.


Bedell Cellars
North Fork of Long Island
MERLOT
RESERVE
1988
PRODUCED AND BOTTLED BY BEDELL VINEYARDS, INC.
CUTCHOGUE, NEW YORK
ALC. 13.1% BY VOL. CONTAINS SULFITES

The deep ocean currents that surround the North Fork of Long Island, New York, create the mild climate that typifies wine-growing regions. The ocean waters, and the streams, ponds, and marshes of the North Fork, provide a haven for swans. Kip and Susan Bedell of Bedell Cellars chose the swan for their label as a fitting symbol of all that is lovely and gracious in the North Fork area.

Once you’ve started your North American list of birds on wines, you might want to look abroad. I’m doing Australia right now. The Hardy Wine Company labels feature specialties from South Australia painted by Jeremy Boot.


HARDY'S
Laughing Kookaburra
Jeremy Boot
1989
WHITE BURGUNDY
HARDYS
Nankeen Kestrel
1990
CHABLIS
ERN AUSTRALIA
HARDY'S
Sacred Kingfisher
1989
NER RIESLING
HARDY
White Backed Magpie
1988
ET SHIRAZ
AUSTRALIA

Networking

by Laura X. Payne

WHSRN spreads a safety net for millions of globe-trotting shorebirds

Windblown clouds shift overhead, alternately obscuring and revealing sharp stars. Chile's leading shorebird biologist, Michel Sallaberry, has been whispering to me in animated Spanish, but when distant flashlights gleam on, we begin to run across the kilometer of dark sand. The only sound is the splat of our boots and the tide falling away. Out of breath, we reach the lights and grope for the small dark forms hanging from invisible nets above the white surf. Ten, I count, twenty. Then my hands work quickly, beside the lights. I free the legs from the net and then, gently, the wings and head. I had forgotten how warm sandpipers are on cold nights and how I would feel this one's heart race. Michel asks quickly for my *chorlito*: I hand the bird to him and head toward the waves for the next.

We are in Punta Rasa, Argentina, at a field workshop sponsored by the Western Hemisphere Shorebird Reserve Network (WHSRN), an international organization for the protection of shorebird habitat. To encourage conservation and research efforts in the neotropics, WHSRN (pronounced "*wissern*" by those in the business) cosponsors field and policy workshops in Central and South America. Although my main position with WHSRN is Communications Coordinator, I have come here for a week as a workshop instructor. The other instructors are Pablo Canevari, a well-known Argentine conservationist and WHSRN's Neotropical Program manager, Montserrat Carbonell, research director of Argentina's Wildlife Foundation, and Michel Sallaberry, a professor at the University of Chile. Nineteen biologists, students, and conservationists from all over Argentina have enrolled in the workshop; together we are immersed in the study of shorebirds and wetlands. Although Pablo and I take part, the local professors provide the leadership. Montse talks about wetlands and conservation strategies. Michel teaches shorebird identification and field techniques. And six other Argentinian biologists present seminars on wetlands and shorebirds.

Our field site, Punta Rasa, is a short sandbar that juts out into the sea 300 kilometers southeast of Buenos Aires. The point defines the boundary between one of the widest river mouths in the world, Rio de la Plata to the west, and the Atlantic Ocean, which reaches in from the north, east, and south. The point's sandy beaches and muddy riverbanks provide a perfect habitat for fiddler crabs, clams, small fish, and the birds that eat them, including herons, flamingos, terns, skimmers, ducks, cormorants, and what we have come to study—shorebirds.

Shorebirds are a diverse group that includes avocets, stilts, curlews, godwits, plovers, and the many tiny sandpipers. Most have long wings, legs, and bills, and most are relatively long-lived—up to 30 years in some species. They feed primarily on invertebrates in wetland areas. Many of the ones we study are long-distance migrants, moving from the southern tip of South America to their breeding grounds on the grasslands and tundra of the Canadian Arctic. During the Arctic summer, the birds take advantage of the abundant food (mainly insects), long daylight hours, and protective vegetation to raise their precocial, camouflaged young. But as the days grow shorter and colder, the birds migrate south. They make the marathon journey in steps, each flight covering as many as 3,000 miles in 60 or 80 nonstop hours. Between flights, the birds land to rest and refuel. At these rest stops, called staging areas, shorebirds must gain enough body fat to sustain them during the next long flight. Some shorebirds, such as the robin-sized red knot, will nearly double their weight during a two- to three-week rest period.

This unique migratory strategy—concentrat-

Left, biologists trap red knots at Delaware Bay, the first site to be established as part of the Western Hemisphere Shorebird Reserve Network (WHSRN).

DOUG WECHSLER

DAVID C. TWICHELL

ing in large numbers at a few key staging areas instead of moving across a broad front in a dispersed fashion as songbirds do—leaves shorebirds particularly vulnerable to habitat changes along their migration route. The key wetlands they depend on may be separated by thousands of miles and affected by entirely different national policies. Each site must offer enough food to support thousands or even millions of tired and hungry shorebirds. This chain of critical areas must be maintained if shorebirds are to survive. The disappearance of a single site could break the chain, threatening not just individuals but entire populations of shorebirds.

WHSRN was launched in 1985 in response to research conducted by federal and private agencies that showed alarming declines in shorebird numbers and accelerating destruction of wetlands. The reserve network was established through a cooperative agreement by the International Association of Fish and Wildlife Agencies, the World Wildlife Fund, and the Academy of Natural Sciences in Philadelphia. Funding was provided through donations from charitable organizations and government agencies. The National Audubon Society and Manomet Bird Observatory (MBO), a research, conservation, and education center near Plymouth, Massachusetts, were selected to co-lead WHSRN. They faced a tough challenge: to protect wild, mobile creatures that depend equally on local sites and on sites 7,000 miles away. To be effective, this conservation movement would need to achieve equal commitments from countries with vastly different political, economic, and social conditions.

Audubon and MBO began by identifying important shorebird sites and setting priorities for conservation action. Delaware Bay, where over half a million shorebirds stop to feast on abundant horseshoe crab eggs each May, was an early candidate for reserve status. In 1985, it became the first official reserve in the network. Today there are 17 reserves in six countries.

Although I have worked for WHSRN since 1989, my affiliation with MBO goes back to 1980, when the organization asked me to participate in their International Shorebird Survey. MBO offered me three weeks of intensive training in shorebird identification, in exchange for which I would conduct shorebird censuses along Peninsula Valdes, Argentina, where I was headed with my family. I agreed, thinking that I would only be involved with MBO long enough to learn to identify shorebirds. But MBO took me by surprise. I was suddenly immersed in a dawn-to-dusk world of birds and research among a highly motivated, serious, but down-to-earth staff. During the days, we observed migratory shorebirds on the beach below MBO. And every two weeks when the tide was low at night, we moved our schedules into the darkness, to coincide with shorebird activity and to take advantage of the diminished visibility of our nets. With MBO's shorebird expert Brian Harrington and a team of banders, I traveled to Plymouth Beach to capture and band shorebirds. Something in the experience spoke to me: something about working on wide open nights by the sea, holding tiny wild creatures for a few hours before releasing them back into the secretive night.

In college, I majored in biology but, finding little inspiration in the drudgery of required courses, switched to English. My interest in ornithology did not go away, however, and although I studied literature and writing during the school year, I worked as a shorebird research assistant in the summers.

Now, 11 years after my first MBO survey, it is no surprise to find myself back in the night, taking shorebirds out of nets. The first days of the Punta Rasa workshop have focused on field techniques; identifying, censusing, using the fine-meshed mist nets, testing the banding equipment. Now we apply what has been learned, setting up nets between vertical poles, perpendicular to the water's edge. We hope to catch shorebirds flying low or feeding near the tide line. Success! Thirty-nine red knots and one sanderling.

As we disentangle birds from the nets, each of us is completely absorbed by a microcosm of tiny wings and thin legs. We do not speak except to

ARTHUR MORRIS

A chain of critical areas must be preserved if shorebirds are to survive. Their unique migratory strategy reminds us of the interlinked nature of all life on our planet.

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offer an extra hand or to ask for patience from a struggling bird. When all the birds have been safely secured in holding boxes and the nets are again empty, we walk back up the beach to wait until the next net check. I realize I am soaked up above the knees, yet I can remember only the sandpipers and not the waves that must have been breaking against me.

On the bumpy dirt road back to the field station where we will band and measure the birds, I listen as three of the participants laugh together about tonight's shorebird successes. In each country where they are offered, these workshops are excellent catalysts for developing a core of professional biologists and conservationists. This particular workshop is no exception. Many of the participants have become close friends, and by the last day of the workshop even those who were silent at first speak up. Something must be done, they agree. The once boundless grasslands of Argentina have been converted to agriculture and cattle farming. The remnants are being developed rapidly, while coastal areas are threatened by oil pollution and uncontrolled tourism. The workshop participants decide to form a research and conservation group called *Grupo Argentino de Limícolos* and to stay in touch through a newsletter.

In addition to the field workshops, WHSRN sponsors policy workshops for mid- to high-level decision makers and regional managers. Here, wetlands are the focus—issues such as land use, habitat destruction, and shorebird conservation. After three concentrated, fast-paced days, participants will use their newly made contacts and strategies to develop long-range management plans for critical wetlands in their countries. Often, data for these wetland areas are provided by biologists trained at other WHSRN workshops.

Clearly, these workshops are tremendously exciting and satisfying for the participants and for those of us who work for shorebird conservation. But they are just one step toward what must be accomplished. The situation for shorebirds is getting worse. More than 50 percent of the wetlands in the United States have been destroyed since colonial times, and wetlands continue to disappear at a rate of one acre per minute. In Canada, wetland losses approach 30 percent. Development and agricultural pressures have resulted in similar wetland degradation in Central and South America. Populations of some shorebird species have already declined by as much as 60 to 80 percent.

To counteract wetland losses, WHSRN has established a network of shorebird reserves. These reserves receive international attention for their critical importance to shorebirds—they are essential to the birds' survival, vital stepping-stones for the Western Hemisphere's migratory shorebirds. WHSRN has four categories of reserves. Hemispheric Reserves support at least 500,000 shorebirds annually, or 30 percent of a species' flyway population. International Reserves support at least 100,000 shorebirds, or 15 percent of a flyway population. Regional Reserves support at least 20,000 shorebirds, or 5 percent of a flyway population. And Endangered Species Reserves are areas of critical value to endangered species; no minimum number of birds is required to establish such a reserve.

To become a WHSRN reserve, an area is nominated by a land manager or landowner, who must also provide substantiated shorebird counts. The nomination is then reviewed by the WHSRN Council. If a site meets biological criteria as well as the larger objectives of the conservation effort, it is approved, and an official dedication ceremony is held within a year. WHSRN offers each reserve technical support, management and research recommendations, and help in developing educational materials. Membership is entirely voluntary, and in every case, actions and decisions remain the prerogative of the landowner.

For established reserves, WHSRN helps increase international communication by a process called "twinning"—pairing reserves that share the same population of shorebirds at different points in the hemisphere. This approach has

ART GINGERT

worked remarkably well: twinning Suriname's three reserves with Canada's Bay of Fundy has led Suriname officals to develop a wetlands management plan for their country, with assistance from the Canadian government.

Besides membership, WHSRN encourages other forms of wetland protection. For example, one important international program that shares WHSRN's goals is the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (also known as "Ramsar" because it was first signed in Ramsar, Iran.) The first reserve to be jointly recognized by WHSRN and Ramsar is Cheyenne Bottoms, Kansas, where more than 90 percent of five species of shorebirds (white-rumped, Baird's, and stilt sandpipers, long-billed dowitcher, and Wilson's phalarope) stop on their way through the dry western United States each spring.

In a few short, overwhelmingly busy years, WHSRN has blossomed into an exemplary and well-known conservation organization. In the Southern Hemisphere, WHSRN has helped launch the Neotropical Wetlands Program (NWP). The goal of NWP (which is also sponsored by Ducks Unlimited and the International Waterfowl and Wetlands Research Bureau) is to identify and protect wetlands throughout Central and South America. WHSRN has held policy and/or field workshops in Argentina, Brazil, Chile, Ecuador, Mexico, Peru, and Venezuela, and local networks—workshop spin-offs—are in place and working on shorebird research and protection there. And in addition to the 17 reserves already included in WHSRN, some 180 sites are under evaluation as potential reserves.

In North America, WHSRN is collaborating with federal and private agencies to improve shorebird habitat in already-protected areas where management practices are geared toward waterfowl. Specifically, WHSRN has helped bring shorebirds and other nonhunted species into the scope of the North American Waterfowl Management Plan (NAWMP), a $1.5 billion, 15-year program to rehabilitate wetlands in the United States and Canada. As part of this major new initiative, WHSRN is producing a shorebird management manual that will tell refuge managers how to manipulate water levels, vegetation, and land use to make more habitat available to shorebirds and other wildlife. In the face of continued wetland destruction, it is tremendously encouraging that programs such as NAWMP are devoting new efforts to improving habitat for a diversity of species—including shorebirds.

After the Argentina field workshop is over, I return to MBO, where WHSRN's headquarters are located. Morning fog breathes in from the Atlantic through open windows. In the banding room across the lawn, catbirds squawk noisily. Across the hall, WHSRN's North American Program manager, Gonzalo Castro, taps on his computer. Pablo Canevari, who has come from WHSRN's Neotropical office in Buenos Aires to catch up on business and prepare for our biannual council meeting, reads a letter proposing to include Tierra del Fuego, a vast tidal bay at the polar extreme of South America, in WHSRN. Each November, as many as 20,000 Hudsonian godwits alight there on the southern tip of the continent to spend the nonbreeding season feeding on the bay's plentiful invertebrates—a biological fuel that will catapult them back to North America.

WHSRN is a young organization with an excitingly successful track record. The energy and great friendships generated by the field workshops are helping to strengthen developing conservation movements in many countries. New wetland initiatives in the neotropics are generating the scientific backbone needed for productive long-term management of these areas. And wetland projects in North America are embracing a much-needed area of management, making positive changes on behalf of nonhunted wildlife. In every case, WHSRN is helping countries and regions move closer to a clean, well-managed environment that can support not just people but millions of globe-trotting shorebirds as well. ■

Laura X. Payne is now pursuing graduate study at the University of Florida, Gainesville.

For more information, contact WHSRN, Box 936, Manomet, Massachusetts 02345.

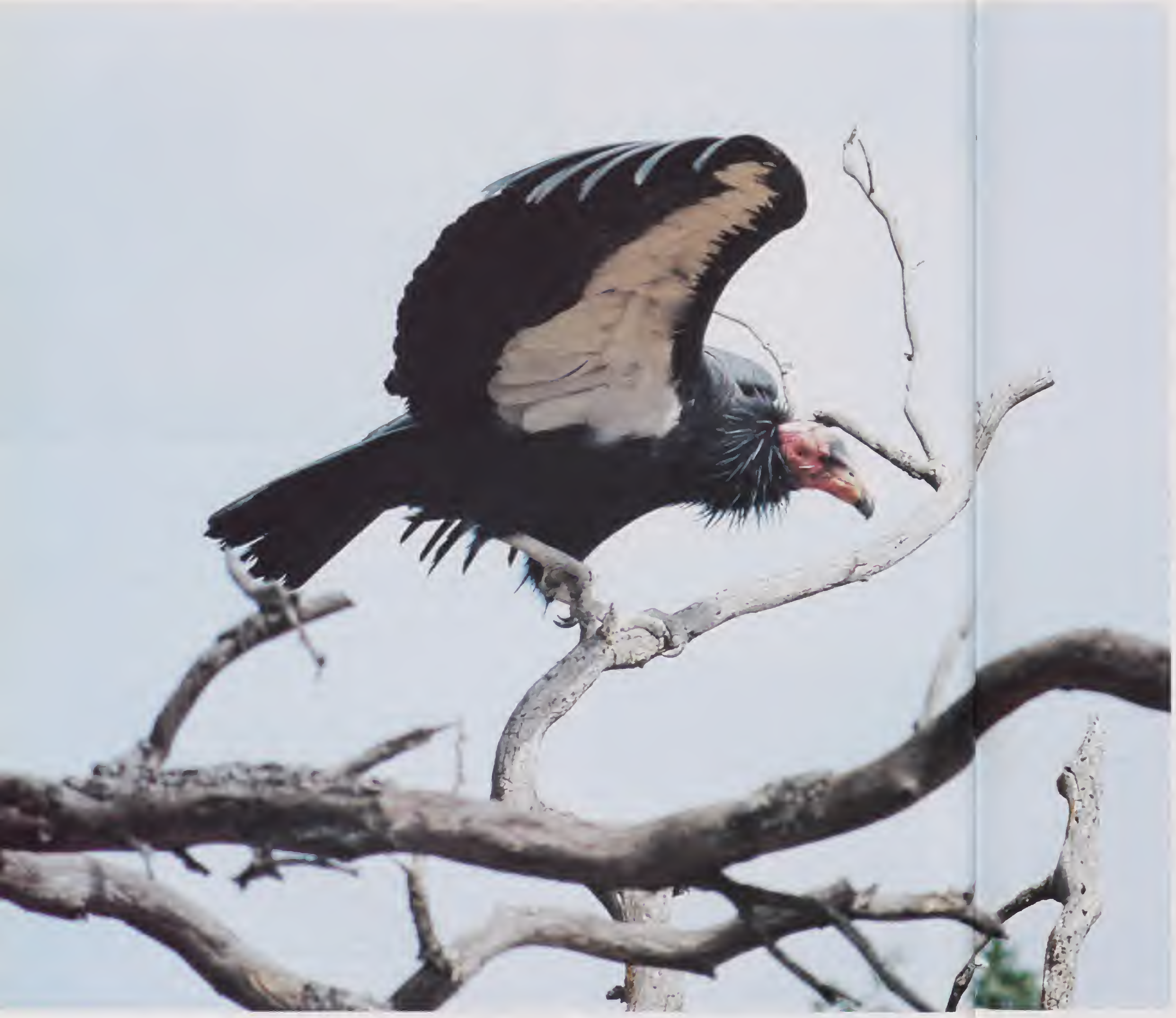
E.P. MALLORY

Left, a newly banded red knot. Birds banded in one reserve may show up in another thousands of miles away. To protect such mobile creatures, WHSRN obtains commitments from countries with vastly different political, economic, and social conditions. Above, author Laura Payne.

Aloft Again

by Tim Gallagher
Photographs by David Clendenen

Researchers prepare for the historic first release of captive-bred California condors



Several weeks before his capture, AC-9, the last free-flying California condor, prepares to launch himself from a tree in the Los Padres National Forest.

April 19, 1987, is a date that biologist Pete Bloom will never forget. On that quiet Easter Sunday morning Bloom lay buried in a pit blind in the rugged hills of the Los Padres National Forest, watching as the last free-flying California condor inched closer and closer to a stillborn calf sprawled on the ground nearby. The condor—a mature male called AC-9 (Adult Condor - 9)—was wary. During the past six months he had seen the few other remaining wild condors trapped one by one—either snared in a 50-square-foot cannon net shot over the bird or grabbed directly by someone hiding in one of the cramped underground boxes known as pit blinds. The great bird peered from side to side and then bent toward the dead calf, stretching its neck to full extension to reach the food. At that instant, Bloom triggered the cannon net. The bird lurched away, trying to outrun the net, but it was too late.

Bloom's satisfaction at a job well done was already tinged with sorrow as he carefully folded the wings of the last wild California condor.

"Trapping AC-9 was the most incredible experience I've ever had," says Bloom. "In some ways, it was both the high point and the low point of my life. I was hired principally to capture condors, so trapping the last one was certainly the highlight of my career. But it was also sad. I knew that for the first time in thousands of years there were no California condors left in the air. I think all of us who were there that day had mixed emotions."

Nearly five years have passed since Bloom trapped AC-9. For some, that event marked the final chapter in the saga of a species that had flown above the North American continent for millennia, dating to a time when mastodons and saber-toothed cats still roamed the earth. They believed that the California condor was extinct as a wild species and would probably stay that way. But recent events may provide a second chance at freedom for this colossal vulture. Thanks to the captive breeding efforts of the Los Angeles Zoo and the San Diego Wild Animal Park, the number of California condors has nearly doubled from the 27 birds alive in 1987 to a total of 53 at the end of the 1991 breeding season.

And this June the Condor Recovery Team—an advisory group set up to guide condor population recovery efforts—asked the U.S. Fish and Wildlife Service to authorize the release of two California condor chicks by the end of the year. It was a significant moment for team leader Lloyd Kiff. "I signed the recommendation to bring the birds into captivity five years ago," says Kiff. "And now I just got through signing the recommendation for the California condor reintroduction to begin. I'm glad that I could be team leader long enough to bridge that gap." According to Kiff, if all goes

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as planned, two young California condors will be soaring free above their native range by this winter.

This happy scenario provides hope for birders, ornithologists, and anyone else who would be filled with awe at the sight of a flying condor. Perhaps we *can* still turn around the California condors' decline. But how did these magnificent birds ever reach their precarious condition in the first place? Actually the condors' problems began long before the present century. During the Pleistocene Epoch, some 11,000 years ago, condors were widespread. Fossil remains of the birds dating from that period have been found from the west coast of North America all the way east to what are now the states of New York and Florida. As many large mammals—giant sloths, mastodons—died off and finally became extinct, the condors lost a major food source. Their range shrank considerably. By the time the Spaniards visited the New World in the late 15th century, the condors were already primarily a West Coast species.

Centuries later, thanks to the California Gold Rush of 1849, the birds faced another serious threat. Thousands of would-be miners flooded into the state, and most of them owned guns. The large, slow moving condors provided an irresistible target. Numerous letters and diaries of the Old West tell of shooting "giant buzzards." California condors were also killed by scientists and collectors in the late 19th and early 20th centuries.

A more prolific species might have been able to absorb the losses from shooting. Condors, however, take five or six years to reach breeding age, and in the wild they generally only raised one chick every two years. So the premature deaths of numerous adult condors placed an unbearable strain on the population.

By the time a serious effort to save the species was launched in the 1980s, the condors were already well on their way toward extinction. The situation called for drastic measures. Researchers decided to increase condor surveillance to determine the major causes of their decline, to manipulate the wild birds so they would produce more eggs, and to take some condors into captivity to use as breeders whose offspring could later be released.

To boost egg production, the condor biologists used a technique called "multiple clutching," taking advantage of the fact that most condor pairs will repeat their breeding cycle and lay another egg if the first egg is lost or destroyed early in the season. The technique works amazingly well. Some pairs were double- and even triple-clutched with no apparent ill effects. Thirteen California condor chicks hatched in captivity from eggs harvested from wild pairs.

The condor recovery looked like an unqualified success during the early 1980s. The number of known wild breeding pairs was steadily increasing—three pairs in 1981 and 1982, four in 1983, and five in 1984. The captive population had grown to 16 condors. The Condor Recovery Team had plans to start releasing captive-reared birds to augment the wild population. In the fall of 1984 the situation could not have looked brighter.

Then the wild condor population crashed. During the winter of 1984–85, nine of the remaining 15 wild condors vanished, breaking up four of the five breeding pairs. In some cases breeding territories were deserted, while in others lone condors showed up mateless at their former nest sites. What happened to the birds is uncertain. Did they perish in harsh winter storms? Were they shot? We may never know the answer.

To deal with the crisis, researchers decided to capture all the remaining wild California condors and place them with the captive birds at the Los Angeles Zoo and the San Diego Wild Animal Park. They reasoned that the surviving wild adults were too genetically valuable to risk losing.

The decision to trap all the condors unleashed a storm of controversy within the conservation community. Even scientists directly involved with manipulating the condors were split over the issue. The symbolism of capturing the last free-flying California condors obviously troubled people who had such a strong commitment to the birds' well-being. They knew that the California condor would effectively become extinct as a wild species. State and federal wildlife agencies eventually gave the go-ahead, and within a few months the remaining wild condors joined the captive flock.

The controversy died down somewhat as the condor recovery effort moved from the field to the breeding facilities at the Los Angeles Zoo and the San Diego Wild Animal Park. Then on March 3, 1988, less than a year after Pete Bloom brought in the last wild condor, a pair of condors at the San Diego facility laid the first captive-produced egg—a major milestone for the program and the species. "Molloko," a female condor chick, hatched on April 29.

Since then egg production has increased steadily each spring, though not all of the eggs have been fertile. In 1989 four chicks hatched from seven eggs; in 1990 eight chicks hatched from 15 eggs laid. This spring was the best to date, with 13 chicks hatched from 22 eggs. The total California condor population now stands at 53 birds, up from 27 in 1987.

"I expect condor egg production to plateau for two or three years in the neighborhood of 25–30 eggs a year," says Bill Toone, curator of birds at the San Diego Wild Animal Park. "After that, the birds that hatched in 1988, 1989, and 1990 should start breeding and boost the numbers even higher."

Some condor pairs are now producing two and even three eggs per season—a remarkable increase for a species that usually laid one egg every two years in the wild. People sometimes ask whether pushing the condors to this level of egg production could eventually discourage them from breeding. Toone is doubtful. "We do it with many other birds," he says. "People keep talking about birds losing interest in breeding, but they seldom take all the variables into account. Birds in the wild often lose their eggs, but they usually attempt to lay again."

Toone points out that ravens frequently destroyed wild California condor eggs. Sometimes a pair would lay two or three eggs and still not be able to raise a chick because of such predation. "I think that the birds have evolved around the necessity of having to deal with the loss of their eggs," he says.

A much more insidious threat that worries Toone is the possibility that future generations of condors will have reproductive problems associated with inbreeding. Perhaps the decline went too far and there are now too few birds to provide the genetic diversity necessary to sustain a species.

"A number of birds are old enough but have not bred yet," says Toone. "Why haven't they? We have some birds who are breeders, and yet lay abnormal eggs with low hatchability. These are just the kinds of reproductive problems that are typical of inbreeding."

Biologist Pete Bloom (above) holds an adult California condor he trapped from a pit blind. Researchers at the San Diego Wild Animal Park help a young condor to hatch (below left).

Mike Wallace, curator of birds at the Los Angeles Zoo, has similar fears. "I feel comfortable with the way we've worked out the breeding in captivity and also the release techniques," says Wallace. "But the real question is genetic. It will take several decades before we really know whether or not the species has a long-term future." Both Wallace and Toone agree that the only reasonable hope is to produce as many condors as possible.

Maintaining genetic diversity in the condor flock has been a major consideration right from the start of the captive breeding program. Researchers took blood samples from the condors and compared their DNA characteristics to determine which birds would be put together to form pairs. They tried to avoid pairing up closely related birds.

One of the major obstacles in the way of early California condor releases has been the need to ensure that each condor bloodline is adequately represented in the captive flock. The Recovery Team requires that a condor pair must produce at least five young to add to the captive flock before any of their offspring can be released. This condition has now been met.

Three release candidates—one from the San Diego Wild Animal Park and the others from the Los Angeles Zoo—have been chosen, though only two of them will actually be set free. "We decided to be conservative this time," says Toone. "Next year we'll probably be able to do a more ample release of California condors, perhaps as many as six."

Young Andean condors are transported by helicopter to a hack site in Southern California (top). Before their release, these Andean condor chicks (bottom) spent several months in a netted enclosure to acclimate them to the area.

The Condor Recovery Team had originally stipulated that at least three condors would be released at a time. (Researchers believe that the birds' physical and social development is enhanced if they are raised in a group of three or more.) To make up the desired group number, two young Andean condors will be set free with the California condors.

If the U.S. Fish and Wildlife Service gives the expected go-ahead, the birds will be taken to a cliffside release site at the Sespe Condor Refuge in Southern California, probably this October when the birds are approximately five months old. At the release site the condors will be placed in a roost box measuring 12 feet by 8 feet by 6 feet high. This prefabricated structure has insulated walls to provide protection during harsh weather, and also a blind attached to the side so that researchers can observe the condors without being seen. The condors will be able to go out into a large, net-covered area where they can sun themselves, exercise their wings, and get used to their surroundings.

When the youngest bird is eight months old—in late December or January—the netting will be removed, and for the first time in nearly five years a California condor will have the chance to spread its wings and soar. It is an eagerly awaited event for many.

"I'm really looking forward to getting those birds out there again," says David Clendenen, lead condor field biologist. Clendenen has spent most of the last nine years of his life working with the condors—long enough to have experienced the euphoria of the early 1980s, when it seemed that nothing could go wrong, and also the despair of 1984, when the birds' wild population crashed. He personally helped trap some of the last wild condors.

"It's been a long road and I'm getting tired," he says. "But I made a vow to myself that I would be here until the California condors are out in the wild again, and I intend to keep it."

Clendenen and the rest of the release team are more than adequately prepared for this momentous step in the recovery program. For more than two years the field biologists have been experimenting with condor release techniques, using captive-bred Andean condors. Similar in size and habits to California condors, the Andean birds provide an ideal surrogate. The field biologists released the South American birds in the Los Padres National Forest, an area where California condors still flew until 1987. Thirteen birds have been set free in four separate releases since 1988 when the program began.

The Andean condor release program has a twofold purpose: to experiment with release techniques that will later be used with California condors, and also to train an effective field crew. Field work with the surrogate birds has already yielded valuable data. Some of the plans for the future California condor reintroduction have been modified based on the research. The field biologists originally hoped to encourage the condors to stay in a relatively small, safe area by providing abundant food. Similar techniques had worked well with released griffon vultures in France.

It was a different story with the Andean condors. The birds ranged far from the release area, some traveling more than 100 miles from the feeding site. On the positive side, however, the birds returned to the site when they were hungry.

"As far as we know, we have not had our birds feeding on any other food except what we offer them in the back country," says Clendenen. "They go out and explore, stay away for two or three days, then come back hungry and go straight for the food."

Some biologists believe that feeding on contaminated food—particularly the remains of deer containing lead bullet fragments—was a major cause of death in the wild condor population. By providing most or all of the wild condors' food, researchers hope that they can greatly reduce the threat from lead poisoning. Finding an adequate source of uncontaminated food for the condors has never been a problem. The field team uses stillborn dairy calves, obtained free of charge from local farmers. Since dairy herds are inspected frequently for disease and contamination, the calves provide a clean, dependable food source.

A wild California condor (left) perches on a lofty cliff at the Los Padres National Forest. Soon these colossal vultures may inhabit their former range once again.

Researchers set the calf carcasses out at feeding sites in the rugged peaks of the Los Padres National Forest. The idea is to teach the birds to only forage in remote areas, far from human interference. "The birds are shy about going down to a new spot," says Wallace. "If we can get them used to feeding only on the mountaintops, they should become reluctant to go down and land on the flats."

Wallace, who pioneered release techniques with black vultures and turkey vultures in Florida and with Andean condors in Peru, designed the California release program. He is not disappointed over how the released birds have reacted. "The main goal of the release program was to have some kind of control over the birds' eating, and we're finding that we're doing just that," he says. "They're feeding right at the areas where we want them to. It's fine if they fly off 100 miles or so. If they'll do that and stay up in the peaks away from people, then we've got a program."

All of the Andean condors from the initial release in 1988 have been recaptured and are slated to be re-released in Colombia, South America, as part of an effort to reintroduce the birds in an area where they were extirpated. Four Andean condors from last year's release still fly free over the Sespe Condor Sanctuary, though they may be trapped before the California condor releases begin.

Despite all the worries associated with the condor program (Is the wild environment too hazardous for them? Will genetic problems prove to be insurmountable?), most people involved with the California condor recovery are hopeful about the eventual outcome. Researchers plan to establish two or more disjunct populations of 100 condors—one of them in the birds' last stronghold in Southern California. Other release sites being considered are Arizona's Grand Canyon and the Gray Ranch, a 321,000-acre property in New Mexico owned by The Nature Conservancy.

Though some California condors may eventually disperse, setting up territories and foraging without human assistance, the bulk of their population will be intensely managed for the foreseeable future. As Mike Wallace says, "It has to be a managed situation. We can't just let them live off our garbage, which is what they've been doing for the last 100 years. That's why they're dying. We've got to take responsibility: create a space for the condors, find out what their needs are, and modify human behavior to accommodate the birds. That's what it's going to take if we expect to have condors in the next century." ■

BOGEN 3011 PROFESSIONAL TRIPOD WITH EXTRA LIGHT FLUID HEAD

Next to a field guide, binoculars, and spotting scope, few things are as important to a birder as a good tripod. Without a tripod, it's just about impossible to hold a scope steady enough to identify distant birds. The high magnification of the scope intensifies the effects of body shake and makes bird viewing a real headache, literally. But not just any tripod will do for birding. To be most effective, a tripod should be sturdy, reasonably compact, and easy to use. The Bogen 3011 with an extra light fluid head fits the bill nicely.

One of this tripod's features that appealed to me immediately was its height. Many tripods are too short for me and, consequently, I have spent a lot of time on birding trips bent over. With its legs and center post fully raised this tripod measures close to 70 inches—plenty high enough to let a six-foot-plus birder stand up straight while looking through a scope. It certainly helps your concentration and allows you to watch birds longer through your scope if you don't have a sore back.

The large plastic butterfly nuts for adjusting leg height on this tripod work smoothly. Just a quarter-turn twist on a release nut lets a leg segment drop to its full extension. A quarter-turn back and the leg segment is locked firmly in place at the height you choose.

Though the Bogen 3011 tripod accepts other heads, I think the extra light fluid head is the best one for birding. It includes a quick-release base plate that allows you to take your spotting scope on or off the tripod with a simple flip of a lever. With the long, adjustable panning arm you can move your scope from side to side or up and down at the touch of a finger. The fluid design eliminates drag, allowing the head to glide smoothly as you pan with your scope.

The fluid head is also an excellent choice if you are videotaping with a camcorder. For any kind of motion picture work, a strong, steady tripod that pans smoothly without drag or vibration is a necessity, and this tripod/head combination is nearly ideal on all counts.

TIM GALLAGHER

If you are primarily interested in using your tripod to take still photographs of birds, this one may or may not be for you. It's a matter of individual preference. Some photographers like to use a head with a panning arm. But I prefer a ball head because it is quick and easy to adjust—valuable qualities when you're trying to line up your camera on a shy songbird. Bogen does make an excellent ball head that will fit this tripod. I recommend that you try out both heads before making a purchase if still photography is your main interest.

This tripod is a little on the heavy side (nearly seven pounds including head) and, at a suggested retail price of $179.95, is fairly expensive. But if you plan to spend a lot of time peering through a spotting scope—perhaps trying to pick out a rarity in a 100,000-plus flock of shorebirds—the Bogen 3011 tripod is well worth the investment.

—Tim Gallagher

THE BIRDING GAME WITH ROGER TORY PETERSON

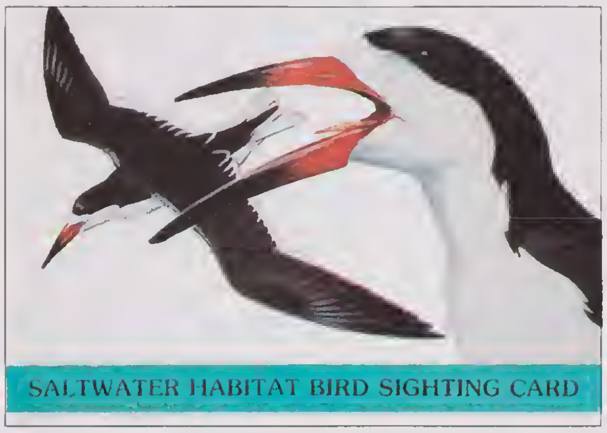
All week we'd been planning to go birding at lunchtime on Friday. Wouldn't you know, at 10 o'clock that morning the season-long drought ended. What to do? Inspiration: we pulled out our brand-new copy of The Birding Game, set it up on my office table, and read through the instructions. A few minutes later we rolled the dice and started playing this simulated Big Day adventure.

I went first, my habitat card directing me to enter the woodland. Todd Culver drew next and headed into the freshwater habitat. Last went Tim Gallagher, into the open country. Then we drew our sponsor and equipment cards. I garnered three sponsors: Birder's Bookshop, Birding Adventure Travel, and the Puritan Birdfeeder Company, for a total of $7.00 per bird. I also found myself with two pairs of binoculars. Oh well, the rules said I could trade equipment later on. Todd and Tim drew similar sponsors, but I was envious of Todd's equipment—a spotlight and tape recorder.

Next we started identifying birds. Venturing three spaces into the woodland, I drew my first sighting card. It instructed me to identify bird 4 on plate 61 of the enclosed booklet of Peterson Bird Plates. Easy! It was a tufted titmouse. But now, to gather bonus pledges, I had to answer a question about the bird. Since I had elected to play at the hard-core level I got a reasonably tough one: "What formerly separate species, most frequently seen in Texas, is now lumped together with this one?" Fortunately I did know the answer: the black-crested titmouse.

The play moved on to Todd: identify bird 2 on plate 5. This tundra swan was easy for our resident waterfowl expert. But the bonus question was even tougher than mine: "What nesting habit of this swan contributes most to its breeding success?" Answer: It nests early, when a land approach by predators is difficult if not impossible. Todd's answer was marginal.

Now it was Tim's turn. Bird 1 on plate 84 was a blue grosbeak, no problem. But the question! "How long does it take the male of this species to acquire full adult plumage? Tim didn't know. In his defense, neither did Todd or I. (Answer: three years.)


SALTWATER HABITAT BIRD SIGHTING CARD

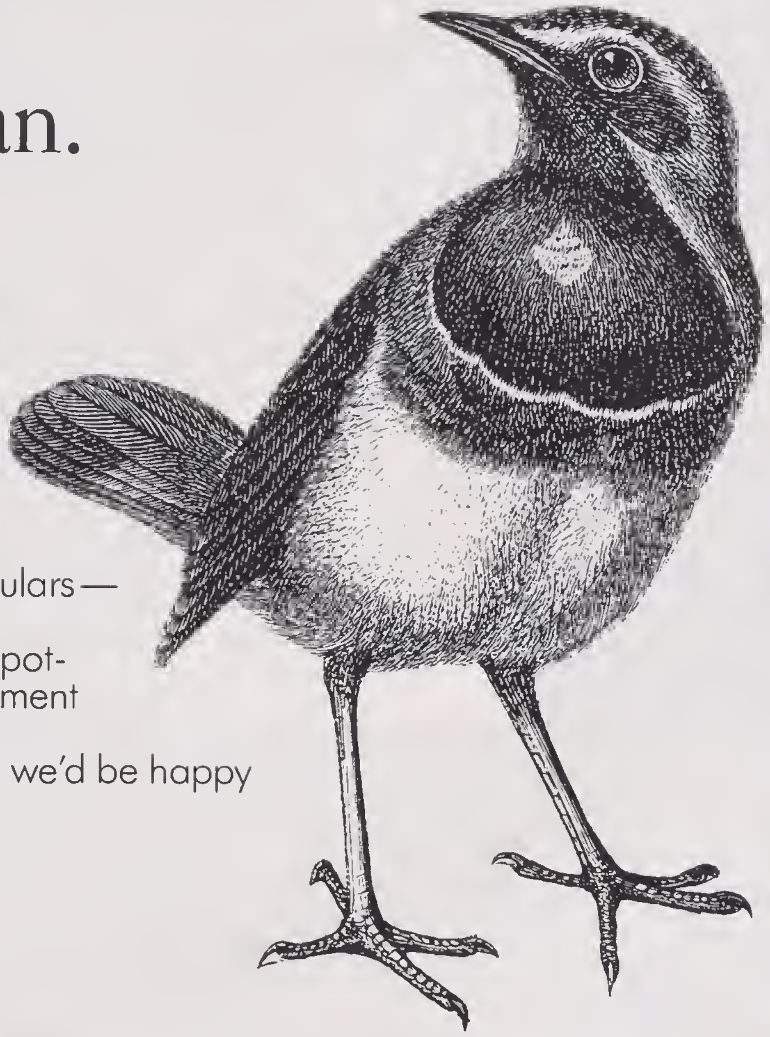
On we played, gathering more equipment cards, which turned out to be prerequisite for answering certain bonus questions; gaining and losing more sponsors; and identifying all the birds with no problem. Nearly two hours later we were still having a great time when we quit to go back to work.

You can play this game at four levels, making it possible for birders at many skill levels to compete. For example, had Tim been playing at the beginner level, he could have identified the blue grosbeak simply as a finch, and his bonus question would have been: "What feature distinguishes this bird from the indigo bunting?"

We did note a couple of problems. Foremost is the alleged sophistication level of the questions; we judged some of the "hard" questions easier than some of the "simple" ones. Also, some of the answers were less than clear-cut.

But all in all, this is a great game. We're certain that all birders will learn as they play, both information about identifying birds and about their ecology. What are you doing the next time you're rained out of a birding trip?

—Rick Bonney



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THE DEVIL LIST!

by Pete Dunne

You can see them sitting in the shadowy corners of the Anchorage Airport Hotel lounge, or hunched over tables at Al T's Restaurant in High Island, Texas—North American Listers.

Their days are long, their nights tortured by dreams of feathered waifs. They thrive on rumor, live for whispers and a telephone ringing deep in the night.

"Yes! The bird was seen on a rising tide. No question about it. They're organizing a charter out of Kotzebue and there's a couple of seats left . . . ."

But mostly they just sit there, nursing their warm beers and stirring circles in pools of catsup with cold french fries. Waiting. Hoping.

Once they were vital and alive, just like you. They birded with enthusiasm and looked at cardinals. But that was before their lives were destroyed by . . .

The Devil List!

How did it happen? How were these once vibrant people ruined? And could it happen to you? The answer is "Yes." It can happen to anyone because it begins with innocence.

Think back! Remember how it was when *you* first started birding? How a window opened up to a world filled with color and song? How every day began with wonder and every evening was buoyed up by the day's discoveries?

Do you remember how the little check marks began mounting in the margin of your field guide—the tiny tokens of achievement, little building blocks of pride?

Do you recall how one day you counted them up and there were 50 and this made you feel good? And then the next time you counted there were 100 and this made you feel even better?

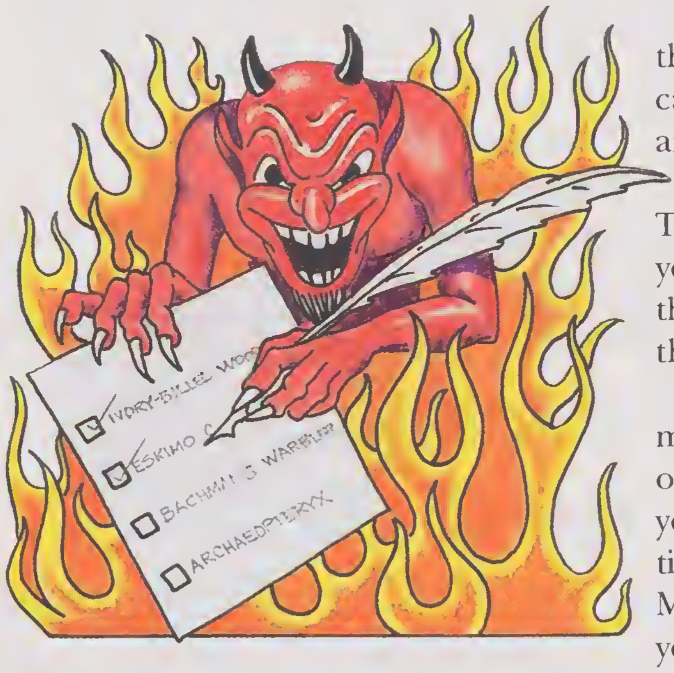
Beware! Before you know it, you too may be on the road to . . .

LISTING MADNESS.

Precisely what *is* "listing?" Well, it's certainly nothing your parents would have told you about at the onset of puberty and nothing your grandmother has ever even heard of. If you were to ask your closest birding friends about listing, they would all assert, would *swear*, that they are not listers themselves. (Nothing here but us aesthetically oriented chickadee mavens, right?) "But that guy over there . . . ."

"What guy?"

"Shhhh. *That* guy sitting over by the wall phone reading *British Birds*. I'm *sure* he's one. Now, you'll have to excuse me, I've got to go call the hotli . . . my hotel."



Listing, simply put, is the acquisition and enumeration of birds seen by an individual; a measure of achievement and skill.

Robin . . . *tick!* Chickadee . . . *tick!* Phoebe . . . *tick!*

But what sometimes happens, not always, but *sometimes*, is that the distinction between skill (which is acquired) and the list (which is the measure of skill) becomes blurred. It *sometimes* happens that people lose their bearings and the list, instead of being a measure of birding skill, becomes the objective of birding. Satisfaction no longer stems from discovering or identifying birds. It comes from adding more birds to the list. And more, and more, and more . . . .

But like wealth, like power, more is not necessarily more satisfying. More becomes an opiate. More only satisfies for a while. It appeases, but it doesn't satiate. It only leaves you wanting . . .

More!

And more plays a little jest on birders. It poisons the process. The more birds a birder finds, why, the fewer there are to find and the harder it becomes to get the next one.

The *next* one. That is the important thing. Never mind all the birds that came before. Never mind all the color and song. What is important is the next bird. The one that hasn't been seen. The one that has eluded you. Cheated you. Mocks you every time you review the list and find an empty box next to the name.

And when you find it, the thirst just moves on until the lure of the list not only controls your birding, it controls your entire life. Determines your vacations. Eats up your expendable income. Makes you miss family gatherings. Puts you on a first-name basis with car rental clerks in McAllen, Texas.

Until finally, one day, long after your spouse has remarried, your children have changed their names, and your unemployment insurance benefits have run out, you pick up your checklist and discover that all the little boxes are filled. You stand at the far side of ambition and stare at a perfect list the way the pioneers might have stared at the Pacific Ocean—with a mixture of horror and frustration. And you look back across a continent stripped of discovery and wonder what it will be like to spend the rest of your days sitting in Al T's, boring patrons with the story of your life barnacle goose.

And now, you'll have to excuse me. I've got to go call a guy. ■

ILLUSTRATION BY JEFF SIPPLE

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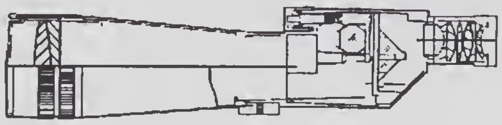

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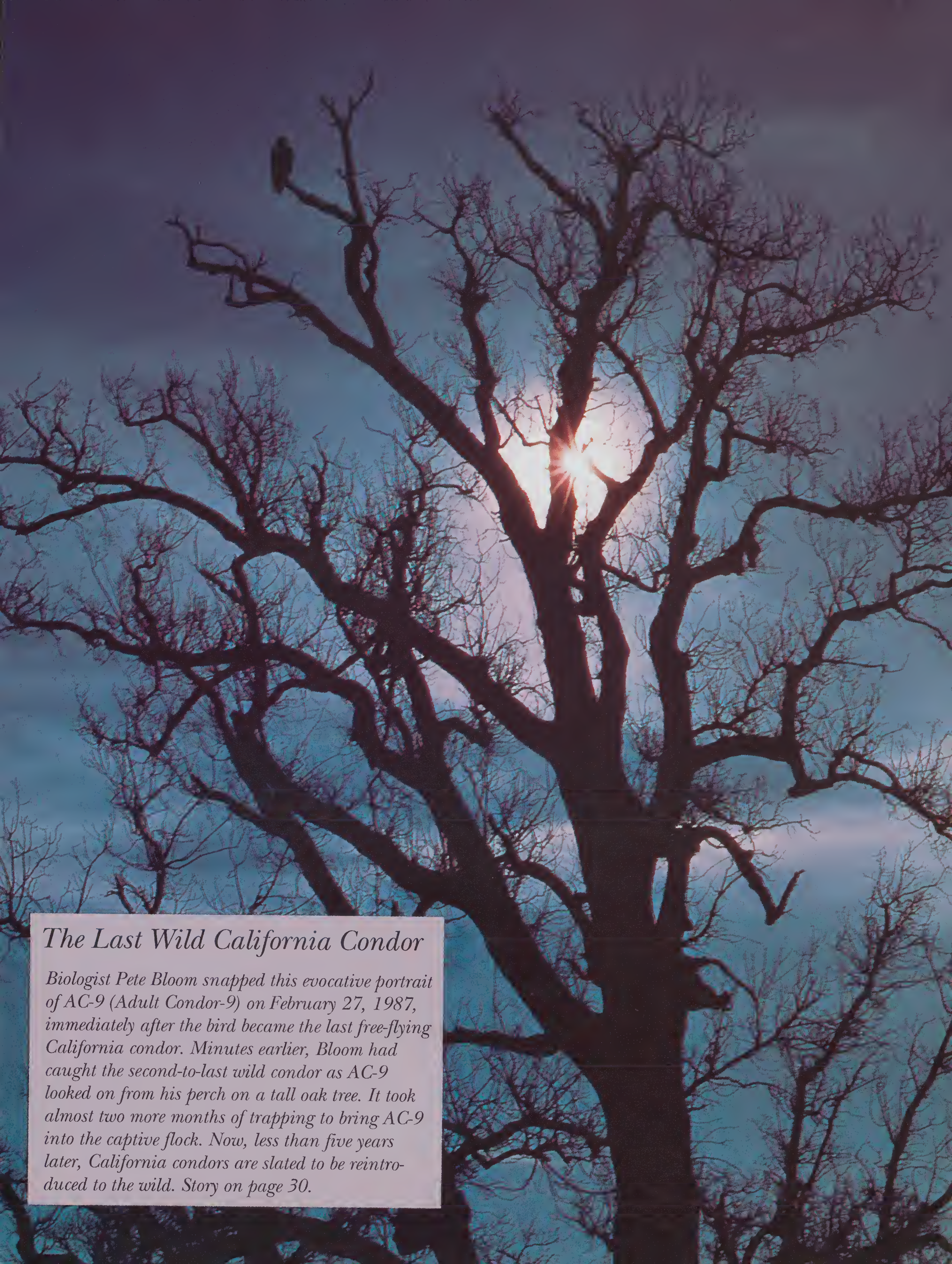

The Last Wild California Condor

Biologist Pete Bloom snapped this evocative portrait of AC-9 (Adult Condor-9) on February 27, 1987, immediately after the bird became the last free-flying California condor. Minutes earlier, Bloom had caught the second-to-last wild condor as AC-9 looked on from his perch on a tall oak tree. It took almost two more months of trapping to bring AC-9 into the captive flock. Now, less than five years later, California condors are slated to be reintroduced to the wild. Story on page 30.

The Cornell Laboratory of Ornithology

An International Center for the Study, Appreciation, and Conservation of Birds

Annual Report 1990–91

A Note to Lab Members and Friends

I write this note at the end of our 1990–91 fiscal year. In a few minutes the books slam closed, the computer tallies the income and expenses, and the ledger sheets read all zeros. We start afresh in a new year. There's not much time to look back— it's time to push into the future, pursuing our mission to develop, apply, and share the tools for understanding birds and protecting their populations.

There is time, however, to offer thanks for your generous support—the support that strengthened our programs and helped balance our books. Your financial contributions allowed the Lab to forge ahead in research, education, and the protection of birds. And your personal commitment to birds spread enthusiasm and concern for our environment at the local, state, federal, and international levels.

Thanks to all of our members for helping to improve our environment in an ecologically wholesome way. We'll all benefit in the end.

Scott Sutcliffe, General Director
Cornell Lab of Ornithology

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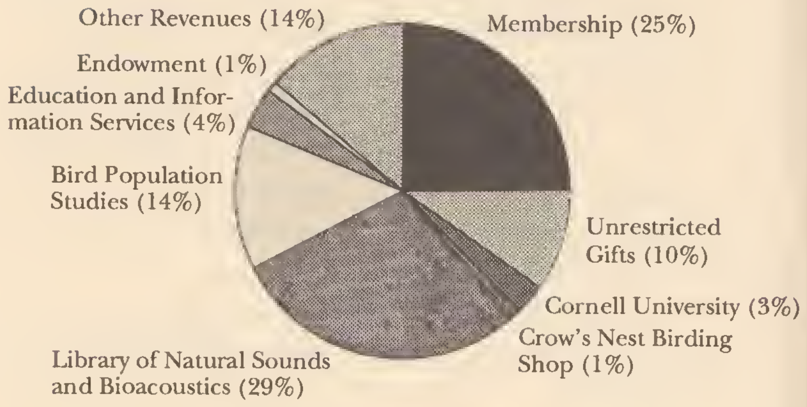
1990–91 Financial Report

Here's a comparison of our 1989–1990 and 1990–1991 finances.

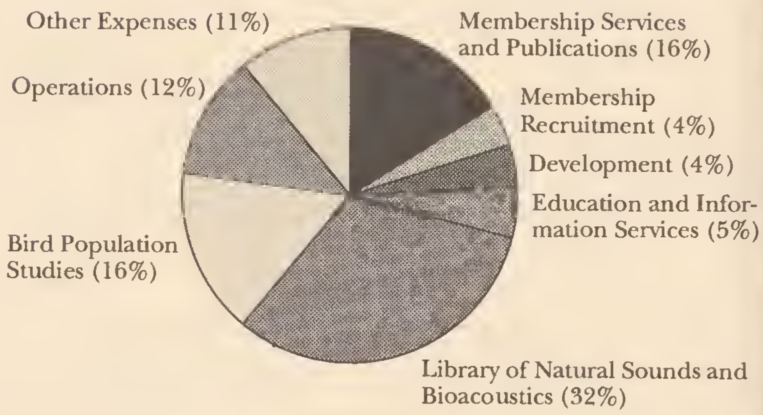
Overall, we showed a surplus of revenues over expenses in 1990-91. Substantial increases in revenue came from our members: membership income increased 14 percent and unrestricted gifts increased 50 percent. We also enjoyed an increase in investment income (76 percent), largely a result of our growing endowment. Revenues from our Crow's Nest Birding Shop increased by 17 percent. Increased program income for the Library of Natural Sounds came from the National Science Foundation. The Bioacoustics Research Program received an increase in research grants. Bird Population Studies had a decrease of funds, a result of fewer research grants and decreased special project support.

Membership and unrestricted dollars paid for all membership, development, and operational costs. The balance ($198,336), added to the Cornell University subsidy ($65,325), investment income ($29,837), and Crow's Nest Birding Shop surplus ($30,370), was used to support our research and education programs.

Support and Revenues, 1990–91



Expenses, 1990–91



	July 1, 1989– June 30, 1990	*July 1, 1990– June 30, 1991*
INCOME		
Membership	$513,981	$587,748
Unrestricted Gifts	153,242	229,191
Investments	16,940	29,837
Cornell University Subsidy	63,633	65,325
Crow's Nest Birding Shop:		
Income after expenses	25,955	30,370
Library of Natural Sounds	128,679	64,110
Bioacoustics Research Program	26,731	328,341
Bird Population Studies	392,074	296,371
Bird Navigation Program	21,889	45,401
Education and Information Services	85,965	100,104
Miscellaneous	265,015	293,359
Total	**$1,894,104**	**$2,370,157**
EXPENSES		
Development and membership services	$282,986	$318,101
Operations	307,581	300,502
Library of Natural Sounds	222,189	432,838
Bioacoustics Research Program	226,731	328,341
Bird Population Studies	389,700	377,100
Bird Navigation Program	21,889	45,401
Education and Information Services	386,549	391,407
Miscellaneous	135,675	176,190
Total	**$1,973,300**	**$2,369,880**
Excess (deficit)	**($79,196)**	**$277**

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LIVING BIRD

WINTER 1992 VOLUME 11 NUMBER 1

Greetings from Sapsucker Woods

Winter has returned to Sapsucker Woods. The temperature is plummeting, the leaves are gone from the trees, and the snow has been falling since daybreak. The woods are eerie under a blanket of snow. The only sounds you hear as you walk the trails are the steady crunch of your footsteps and the occasional raucous calls of a crow or jay.

And yet signs of life are everywhere. You can read the nightly activities of the sanctuary's wildlife each morning on the newfallen snow: tracks of deer, raccoons, rabbits, and tiny rodents. Birds leave their marks as well: pellets of undigested fur and bones under an owl's roost; a tiny pile of feathers where a sharp-shinned hawk has recently dined.

In keeping with the season, we've chosen the snowy owl as our cover bird and also as the subject of a photo essay. I didn't realize what an appropriate choice it would be until a couple of weeks ago when a snowy owl showed up less than a mile from the Lab. A dozen of us dropped our work and ran to see the bird the minute we heard about it. For an hour or more we stood huddled and shivering behind spotting scopes, staring intently at this pale ghost from the north. For all of us, the bird brought back fond memories of other snowy owl sightings in other times and places: North Dakota, Washington, Minnesota, Canada. The common threads in all these sightings were the time of year, the frigid temperature, and the comaraderie with other birders present.

Now as we begin the 1992 publication year at *Living Bird*, we would like to thank you, our members and friends, for all your support and encouragement. Best wishes for the year ahead!

— *Tim Gallagher, Editor*

Cover: *A ghostly winter visitor from the far northern tundra, this snowy owl seems completely in its element on a frozen field in Manitoba. Photographer Jack Barrie spent four winters documenting this striking Arctic raptor. For more of his snowy owl photographs, turn to page 16.*

Right: *Is there a selfish motive behind the white-fronted bee-eater's altruism? Story on page 26. Photograph by Rita Summers.*

Back cover: *Looking bedraggled and forlorn, four bald eagles wait out a winter storm. Photograph by Tom Mangelsen.*

Features

10 **The Giant Grebes of Atitlán**
by Anne LaBastille
Even under the close scrutiny of scientists and government agencies, an entire species can vanish from the Earth.

16 **Northern Invader**
Wildlife photographer Jack A. Barrie presents a stunning portfolio of a favorite winter raptor—the snowy owl.

22 **A Birdwatcher's Cookbook**
by Erma J. Fisk
Need a nourishing snack to take along on a cold day of birding? Try a few of these recipes from Jonnie Fisk's popular cookbook.

26 **Family Ties**
by Natalie J. Demong and Stephen T. Emlen
Some white-fronted bee-eaters forgo nesting themselves to help their relatives raise young. What's in it for them?

Departments

4 **Letters**

5 **BirdNews**

Columns

8 **My Turn** *by Paul Kerlinger and David Wiedner*
Birders should learn to flex their economic muscles.

32 **Beyond the Field Guide**
by Richard E. Bonney, Jr.
The alarm sounded for bluebirds, and people responded across the continent.

34 **In the Field** *by Jack Connor*
When it comes to studying bird behavior, there's no easy road to enlightenment.

36 **Spotlight**
by David S. Wilcove
The São Paulo tyrannulet is just one of many species headed for disaster.

38 **The Catbird Seat** *by Pete Dunne*
Covering up a case of mistaken (bird) identity takes an expert.

LIVING BIRD

WINTER 1992 VOLUME 11 NUMBER 1

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Letters

Kudos

I have been a member of the Lab for a long time and appreciate *Living Bird* magazine very much. It's refreshing to read scientific articles with a sense of humor. Keep it up!

Delanna Schneider
San Rafael, California

The front and back covers of the Autumn 1991 issue are beautiful. We're proud to keep the magazine in sight on the hearth. And the pages between the covers are the best ever. Just wonderful!

Mr. and Mrs. Donald Johnston
Newark, New Jersey

I've Been There

I want to call to your attention to two points in the Winter 1991 issue.

First, with regard to "Landscaping for Birds," in my neck of the woods, friends who are into landscaping no longer recommend the use of the dogwood species *Cornus florida* (flowering dogwood), as one is too likely to lose the trees to anthracnose. *Cornus kousa* (Japanese dogwood) appears to be resistant to the disease. Second, in "Will-o'-the Wisp," Dr. Jackson is incorrect in saying that Cuba has been off-limits for U.S. citizens "since the Castro revolution." I went there in 1982 with a group from the Massachusetts Audubon Society. Apparently President Reagan had not yet got around to instituting the Draconian laws that Jackson mentioned: none of us was fined or imprisoned.

Alice Dimock
New London, Connecticut

Information, Please

I compliment you on your evaluation of the new Leica Ultra 8 x 42 bins ("Critics' Corner," Summer 1991). You did not, however, mention how well someone who wears glasses would do with them. How much of the usual field of view would he or she get? This is not a small point, as I suspect many of your readers do wear glasses.

Also, although you cautioned that you did not test the 7 x 42, I think you might have mentioned that the close focusing distance of this model is well over that of the 8 x 42.

One final chew: Your comprehensive binocular review ("Scanning for Optics," (Autumn 1988) identified those bins that would be unsuitable for people who have close-set eyes. This point you also missed in your Leica review.

K.W. Brandes
Hamburg, New York

But Wile E. Coyote Likes It

Your recent special issue on bird song was fantastic. Being a professional tin-ear myself, I was grateful for Jack Connor's advice on overcoming my handicap. I also found Cynthia Berger's "Case of the Singing Syrinx" a well-told story. Greenewalt's work would have been lost on me had it not been presented in such a lively way.

I have only one disagreement—with your choice of cover bird. Why the roadrunner for an issue on bird song? *Beep-beep* may be music to the ears of some people, but I would have thought this the time to give us the common house wren in all its aural glory.

Emily Wheeler
Buffalo, New York

We confess that our cover banner hailing "bird song" was misleading. Our special issue was actually dedicated to the broader but less euphonious topic of bird sounds—*not just songs but calls, contact notes, drumming,* beep-beep, *and all the other audibilities that birds produce.*

We welcome letters from readers. Address letters to: The Editors, *Living Bird*, 159 Sapsucker Woods Road, Ithaca, New York 14850.

BirdNews

This quarter in BirdNews we feature research reports from the 109th annual meeting of the American Ornithologists' Union. Members of that venerable scientific organization gathered in Montreal this past August for three days of talks—over 300 different presentations—on every imaginable aspect of bird biology. Here are just a few of our favorites.

DIET FOR A SMALL FRUGIVORE

Birds, like humans, need a balanced diet of sugars, fats, and proteins. But while some birds lose weight when their diet is restricted to sugary fruit, cedar waxwings keep their weight up. To learn what makes them such efficient fruit-eaters, **Mark Witmer** of **Cornell University** compared the digestive process in waxwings and four species of thrushes that make fruit a lesser part of their diets. He fed caged birds a controlled diet, then collected their body wastes for biochemical analyses.

First the birds were fed glucose-agar, a sort of bird jello, to measure the time it took for the substance to pass through their digestive tracts. Waxwings processed the stuff faster than the larger American robins, but at about the same rate as the similarly sized hermit and gray-cheeked thrushes.

Witmer then fed the birds unlimited chokecherries—a sugary, watery fruit that the test species relish in the wild—and measured how much they gobbled up. Waxwings ate more than thrushes, about 1.7 times more fruit per gram of body weight, and also maintained their weight better, losing less nitrogen per gram of body weight.

Finally, some birds were dissected and their intestines examined. Cedar waxwing intestines had an internal cross section three times greater than those of thrushes, but were 16 percent shorter. With such a short, wide digestive tract, waxwings can rapidly process a comparatively large "cylinder" of food, extracting nutrients efficiently from the sugar-rich, digestible chokecherries.

STOP-'N-GO FORAGING

Some soaring hawks locate their next meal by "cruising": scanning for prey while they fly. Northern goshawks and Cooper's hawks, on the other hand, are thought to be "sit-and-wait" predators that scan for prey while perched, then launch an ambush from the perch. But data to support this notion are sparse because the hawks are hard to track in the dense forests where they hunt.

New research from **Patricia Kennedy** and **James Gessaman** at **Utah State University** suggests that these two accipiters actually use a strategy that's intermediate between cruising and waiting. The researchers used radiotelemetry to follow the movements of eight northern goshawks and 24 Cooper's hawks in the Jemez Mountains of north central New Mexico. Each bird was fitted with a radio transmitter mounted either under its tail or in a tiny backpack. These transmitters were designed to emit two different sounds depending on whether the bird was horizontal (flying) or vertical (perched).

Kennedy and Gessamen found that both species typically made short, 1- to 3-minute flights to a new perch every 8 to 13 minutes. This activity pattern, using shorter scanning periods than the "sit-and-wait" approach, fits best with what behaviorists call a saltatory or "stop-and-go" foraging strategy

GEORGE RINKER

Pat Kennedy with a juvenile goshawk.

In addition to revising our opinion of how goshawks and Cooper's hawks spend their days, the Utah State study challenges the current foraging theory that two species of accipiter can't coexist in the same range unless they use different foraging strategies or take different prey. In the Jemez Mountains, goshawks and Cooper's hawks share similar strategies, prey, *and* space.

OF TESTOSTERONE AND TLC

When bird parents pitch in to care for their young, each is sensitive to the effort put forth by the other. The result is a dynamic equilibrium between the sexes as both male and female protect their own best interests. To determine the role of hormones in maintaining this equilibrium, **C. Ray Chandler** of **Indiana University** and collaborators **Ellen Ketterson, Val Nolan, Jr.,** and **Charles Ziegenfus** compared parenting behavior in normal and high-testosterone male dark-eyed juncos.

Working at the Mountain Lake Biological Station in southwestern Virginia, they surgically equipped some male juncos with testosterone implants, giving other "control" males empty implants. All the birds were released to choose territories, find mates, and nest. After the eggs hatched, the researchers noted how often the pairs brought food to the nest.

The control males were model fathers, sharing the task of feeding their young 50/50 with their mates. Furthermore, when the females brought lots of food to begging nestlings, the males did too, so male and female provisioning rates were highly correlated. The testosterone-boosted males, on the other hand, made only about 30 percent of the food deliveries to their nests. Their

COMPILED BY CYNTHIA BERGER

mates took up the slack so that the young still got as much food as control offspring. Meanwhile, the provisioning rates of the testosterone treatment pairs weren't correlated: the males didn't necessarily repond to cues from the nestlings in the same way that the females did.

Chandler and his colleagues conclude that elevated levels of testosterone alter or constrain a male junco's behavior. Although a high level of the male sex hormone is critical for proper breeding behavior such as defending a territory or singing, it makes him a less equitable participant in parental duties.

MANAKIN MANNEQUINS

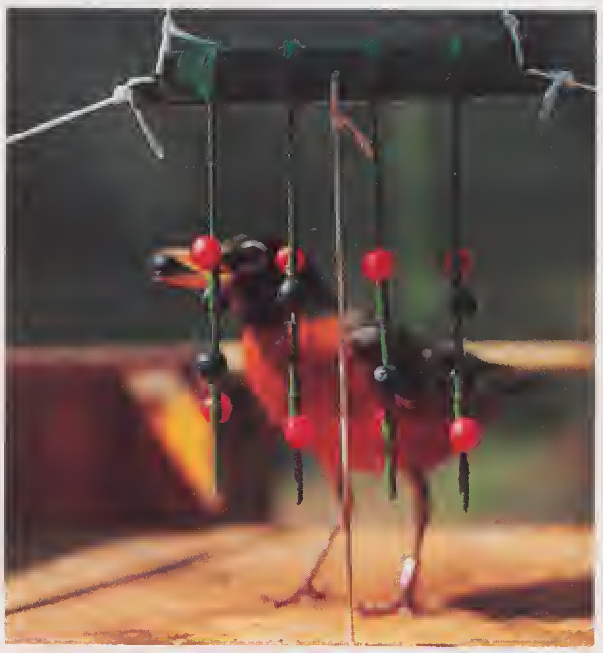
Some male passerines don't get their bright, "definitive" plumage until their second mating season. Male long-tailed manakins—tropical birds that form leks to attract mates—have to wait even longer, donning brilliant red, black, and blue definitive plumage only in their fifth season. Why such a long wait? wondered **David McDonald** of the **University of Florida.**

He rejected the idea that less colorful predefinitive plumages help young males hide from predators. Although some lekking species suffer high rates of predation, during thousands of hours of observations not even the highly visible definitive male long-tailed manakins had ever been attacked. McDonald conjectured that the more subdued plumages might proclaim a bird's age and status. For example, a 3-year-old might signal that he is no reproductive threat to top males, but also that he is more than a match for younger males in dominance contests. On the other hand, male manakins in predefinitive male plumage resemble female manakins. Might they be using their appearance as a disguise, sneaking past the older males to mate with receptive females wooed by their elders?

McDonald watched how males reacted to "manakin mannequins," taxidermic mounts in predefinitive or definitive plumage, posed on a stand. As controls he presented the stand by itself, a "neutral" nonthreatening species (a Swainson's thrush) and a potential predator (a snake made of modeling clay). The males reacted to both manakin models (although more strongly to the definitive model) with mobbing choruses similar to the strong reaction provoked by the snake. They reacted only slightly to the thrush and not at all to the stand. Because predefinitive plumage evoked such a reaction, it probably doesn't enable a young male to mimic a female. Predefinitive plumage probably moderates, but does not eliminate, aggression by older males. It may also help in establishing rank among young males.

MARIE READ

Male long-tailed manakins perform a dazzling leapfrog dance for a watching female.


REX SALLABANKS

"Mmmmm, this one looks good!"

SO MUCH FRUIT, SO LITTLE TIME

A hungry bird in a berry patch has some critical decisions to make in a hurry. Which bush should it feed in? Which fruits should it pick? Should it swallow the fruit it has picked? **Rex Sallabanks** of the **University of Oregon** examined how American robins make foraging decisions.

Sallabanks measured European hawthorn bushes in a Nature Conservancy preserve, noting the dimensions of each bush and the abundance, mean size and weight, and mean seed size of its berries. He then monitored fruit removal throughout the fall and winter. Robins significantly preferred the bushes with the largest berry crops.

The next year Sallabanks selectively removed berries so that some bushes had uniform crop sizes. When fruit size varied, robins chose the bushes with the largest fruits. When fruit size was uniform, robins preferred bushes where the fruit had the highest pulp-to-seed ratio. These results suggest that robins use a hierarchy of decision cues to choose where to dine.

In aviary experiments, five robins were trained to eat "doughfruits" (see photo above). Through choice tests, Sallabanks found that robins preferred large fruits to small ones, but that seediness was unimportant. These results suggest that in the wild, once a berry bush has been chosen a robin's fruit-selection decisions are made visually, based on fruit size, not when the bird has the fruit in its bill.

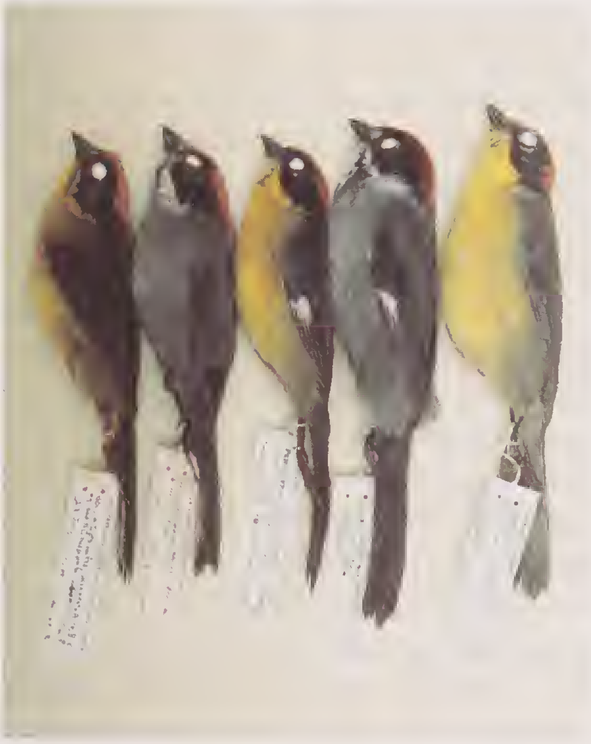
Don't Judge a Bird by its Feathers

Taxonomists traditionally placed two types of Andean brush-finch at opposite ends of the genus *Atlapetes*, declaring them to be separate species. This classification seemed eminently sensible, for the birds look completely different—*A. rufinucha* has yellow underparts whereas those of *A. schistaceus* are gray.

J. V. Remsen of **Louisiana State University** suspected that despite these dramatic differences in color the two species are close relatives. He noted that details of feather patterns are identical in the two species, which are indistinguishable in black-and-white photographs. The birds' vocalizations also are virtually identical. And the two species occur in a peculiar pattern of distribution, alternating with one another sometimes elevationally along a mountain slope, sometimes latitudinally. But brush-finches are sedentary, incapable of long-distance flight, so the two species couldn't have leapfrogged over one another to create this checkerboard distribution pattern.

Could the birds simply be yellow and gray representatives of a single species? Remsen knew that three other species of birds have alternating yellow/gray/yellow populations along the same Andean slopes. Remsen and collaborator Shannon Hackett analyzed genetic differences among populations using a technique called protein electrophoresis. They found that some *rufinucha* populations are more similar to adjacent *schistaceus* populations than they are to geographically distant *rufinucha*, a finding that supports the "one species" hypothesis. The researchers are now using other biochemical techniques to further test this hypothesis.

J.V. REMSEN



Could these birds be a single species?

Wood Stork Strategy Switch

Wood storks breed in the dry season in southern Florida. As the edges of the expansive wetlands dry out, fish and other prey are concentrated and easy to catch in the shrinking pools. Over the last decade, the endangered storks have expanded their range to areas in east central Georgia where wetlands are widely but patchily distributed. **Malcolm Coulter** of the **Savannah River Ecology Laboratory** wondered whether storks took advantage of a similar "drying edge" effect in their new habitat. He also asked how the storks chose a foraging site in the mosaic-like landscape and whether the birds exchanged information about the location of the best feeding areas while roosting together in their colonies.

Coulter measured the physical characteristics of Georgia sites where storks fed. Although swamps are the most common type of wetland in the area, the storks favored shallow ponds and marshes with sparse aquatic vegetation and not much tree canopy cover. No seasonal drying edge effect could be measured at the Georgia sites, which typically provided the storks with larger fish at lower densities than the Florida sites. Since the storks usually traveled alone to foraging areas and rarely congregated in large numbers, Coulter concluded that they weren't sharing information at the colony sites.

So even though wood storks take advantage of predictable seasonal changes in prey abundance in their traditional Florida habitat, they have switched their strategy with the move to Georgia. The storks can forage efficiently in a landscape where food is unpredictably available and where food abundance changes rapidly. This flexibility in foraging behavior is an adaptive characteristic for any species, but particularly for an endangered one.

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My Turn

BIRDING ECONOMICS

OR BIRDERS MEAN BIG BUCKS

by Paul Kerlinger and David Wiedner

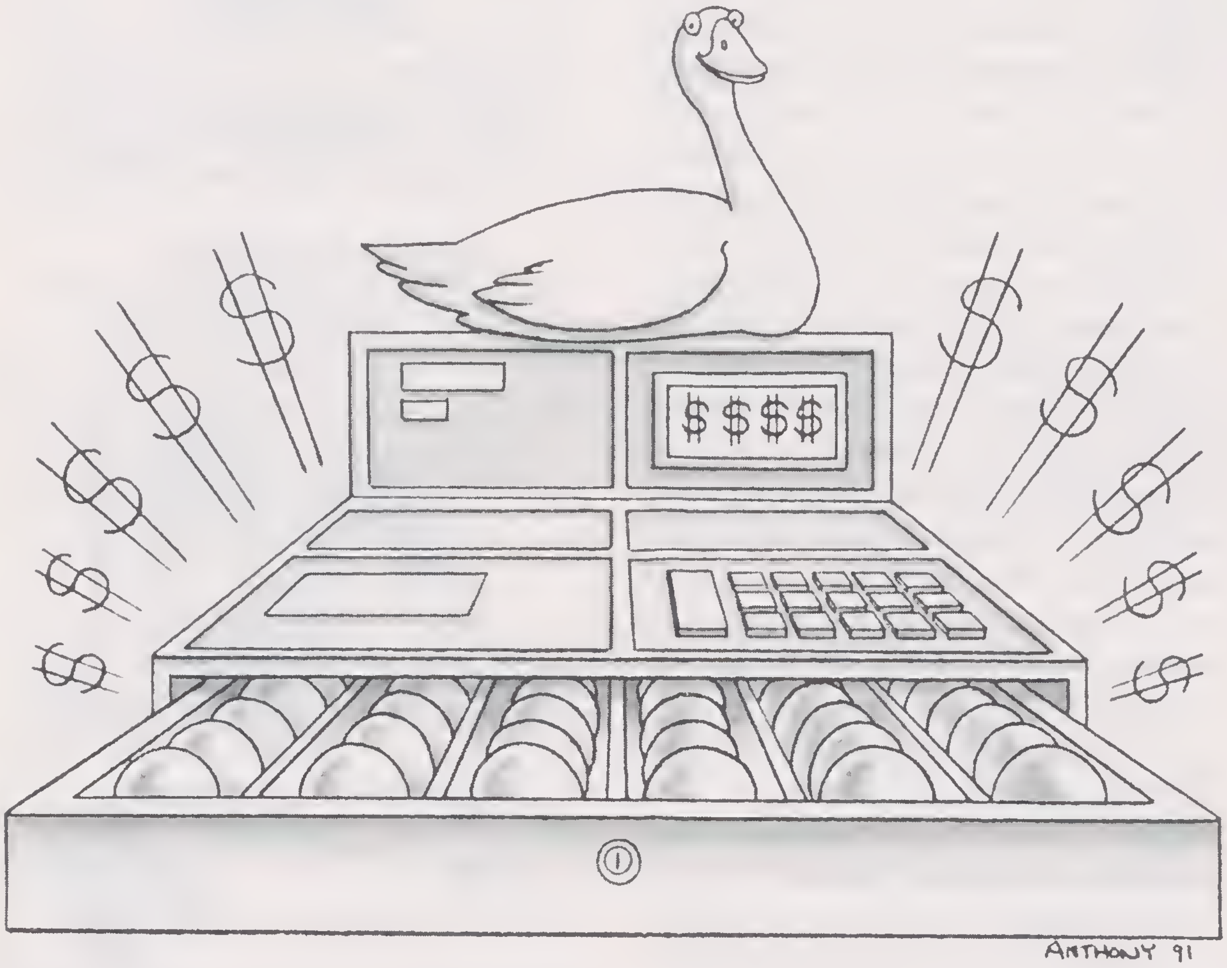


ILLUSTRATION BY ANTHONY TABER

When we see a carload of birders in Cape May, New Jersey, we see dollar signs! Although our parents taught us that it was impolite to talk about money, they also taught us that money was indispensable. We want to alert birders to the enormity of their economic influence.

First, what do we know about birding economics? Unfortunately, very little. Few studies have asked how and where birders spend their money. The U.S. Fish and Wildlife Service (USFWS) conducts a National Hunting, Fishing, and Wildlife-Related Recreation Survey at 5-year intervals, but up until 1985(the most recent survey published), birders were lumped with other "nonconsumptive users of wildlife," including photographers, backpackers, wildflower enthusiasts, and others who enjoy nature but do not take game. The USFWS surveys are an important first step in understanding birding economics, but apart from measuring expenditures for bird feeding they do not "fine focus" on birders.

To learn more about birding economics, the New Jersey Audubon Society's Cape May Bird Observatory conducted two surveys in 1988 and 1989. The first asked how much money birders throughout the United States spend each year on their hobby. The second survey focused on how much money birders contributed to the local economy in Cape May. One of the most popular birding sites in North America, Cape May attracts more than 90,000 birders annually. We suspected that these birders were an important source of revenue for Cape May businesses. In both cases, we wanted to learn not only how much money birders spent but where and on what things. In addition, we wanted to learn more about the demographics of birders: their sex, age, income, education, and other facts that would help us determine the economic impact of birders. Our studies were funded, in part, by a grant from Humphrey Swift of Swift Instruments, Inc.

We felt that the information from our survey could be used as a conservation tool, especially for preserving open space (called habitat by birders). We also suspected that birders were a potentially enormous source of revenue for conservation causes, much as hunters and anglers have been a source of revenue for federal and state programs.

For the national study we sent questionnaires (using stratified random sampling) to some 3,500 Christmas Bird Count participants. About 1,140 completed questionnaires were returned. For the Cape May study we distributed approximately 850 questionnaires to birders; an astounding 835 were returned. The questionnaires, which contained 30 questions and took about 10 minutes to complete, were distributed at the Cape May Bird Observatory and three nearby birding locations. The only criteria we used for selecting respondents were that they be wearing binoculars and that they answer "yes" when asked if they were looking at birds.

Our national survey of active birders revealed that birders no longer fit the long-enduring stereotype. That quintessential cheapskate—the little old lady in tennis shoes—is a myth! Birders spend large sums of money in pursuit of birds: a conservative $1,850 per person per year on a wide variety of products and services. Travel to and from birding sites represents the largest portion of spending (trips to Africa, Venezuela, and Southern California are expensive).

Optical equipment such as binoculars and spotting scopes can cost thousands of dollars. Other birding paraphernalia includes tripods, special clothing and footwear, books—both field guides and coffee-table books—cameras and film, and artwork. Birders may not wear Calvin Klein clothes, but Gore-Tex® ain't cheap. The typical Cape May birder totes the following: binoculars, a scope, a tripod, two field guides, a windbreaker, and boots—more than $1,000 worth of gear even assuming these are not top-of-the-line items. Today's complete birder may have a Marantz cassette recorder and video camcorder, if not to record the day's activity, then to play the latest birding video. That the cost of birding paraphernalia can amount to a tidy sum is probably not news to birders, but manufacturers, wildlife managers, and the general public need to be informed of our purchasing power.

On the local level, we learned from our Cape May survey that birders spend millions of dollars during their annual migration to New Jersey. Consider these facts: survey respondents stayed at 63 different motels, 29 bed-and-breakfasts, and 14 campgrounds; they purchased meals at 118 different eating establishments, and most purchased gasoline during their stay. We estimated that birders contributed $6 million to the Cape May economy in 1988, and that's without using a multiplier. (A multiplier of two or three is used in many studies of fishing and hunting to indicate how the money is spent and respent in a community.)

Birders spend more than hunters in Cape May, and the birding revenues are particularly important to the community because they boost the slumping tourist economy between Labor Day and Memorial Day. Furthermore, birders rarely need to be regulated (at some cost to taxpayers) like boaters, hunters, and anglers. The one exception may be traffic problems at some hot spots.

Cape May is not the only local economy that benefits from birding. Hawk Mountain Sanctuary in Pennsylvania, Point Pelee National Park in Ontario, and the Rio Grande Valley in south Texas lure hundreds of thousands of birders each year. A study done at Point Pelee in 1986 showed that birders spend about $2 million a year in this small area alone. Dozens of communities across the country receive similar economic benefits from birders.

Naturally, the places that birders frequent are also the places that birds frequent. These are usually critical areas for large numbers of birds, serving as migratory stopovers, breeding sites, or wintering areas. Thus, the preservation of birding hot spots can benefit the birds, local economies, and birders alike.

When we see a pristine forest or barrier island we see good birding, tranquility, and the chance to preserve biodiversity and endangered species. Some developers see "wasted space" and think about how much money they could make. When they argue that they should be allowed to develop a forest or wetland, they cite the jobs they will create, how taxable building units will reduce the tax burden of a given town, and how the free enterprise system allows them to make money. When land use is the issue, politicians and bureaucrats are seldom convinced by arguments that rely on aesthetics. Few people in positions of power care about the habitat requirements of migrant birds, even if they are endangered species. Instead, they must be shown the economics of both sides of an argument. The economic and environmental health of many regions requires maintaining open spaces to sustain both tourism and wildlife.

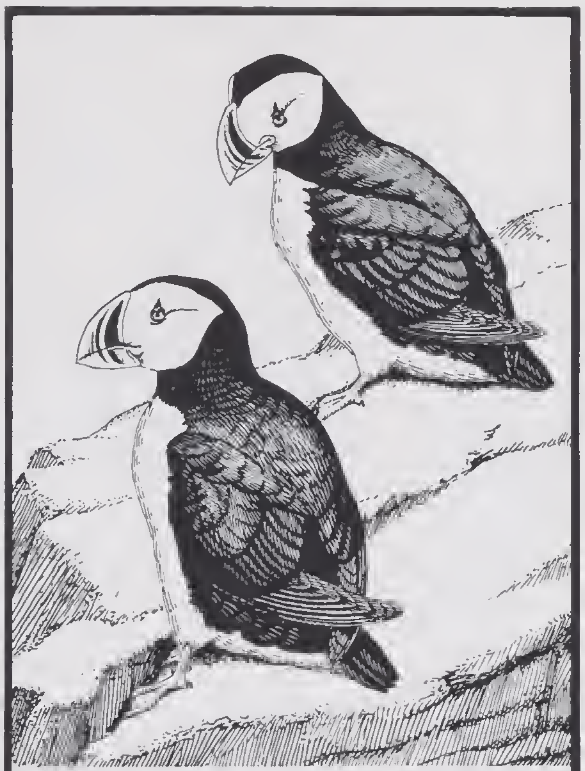
What can birders do to show that they represent an economically important group? Promote birding! Do not be embarrassed to wear binoculars into a diner, quick-stop market, or motel. Ask the manager how the birding has been. There's no difference between asking, "How's the birding?" and "How's the fishing?" Before long, business people will begin to realize that birders mean bucks—and they don't leave bait in the refrigerator or fish heads in the trash.

Local officials, businesses, and residents in prime birding areas need to be made aware that birders bring money into their communities. A few towns cater to anglers; others cater to hunters. What's wrong with catering to birders? The money looks the same and has the same purchasing power.

Our studies and those of a few other researchers will reveal how much we birders contribute to the economy. Used cautiously, these statistics can help us to improve our birding opportunities and perhaps even preserve some important pieces of bird(ing) habitat! ■

Paul Kerlinger is director of the Cape May Bird Observatory and director of research for the New Jersey Audubon Society. David Wiedner was a research associate at the Cape May Bird Observatory and is currently at the Academy of Natural Sciences, Philadelphia.

Take your turn! Submit your comments on birding issues to: My Turn, *Living Bird*, 159 Sapsucker Woods Road, Ithaca, New York 14850.



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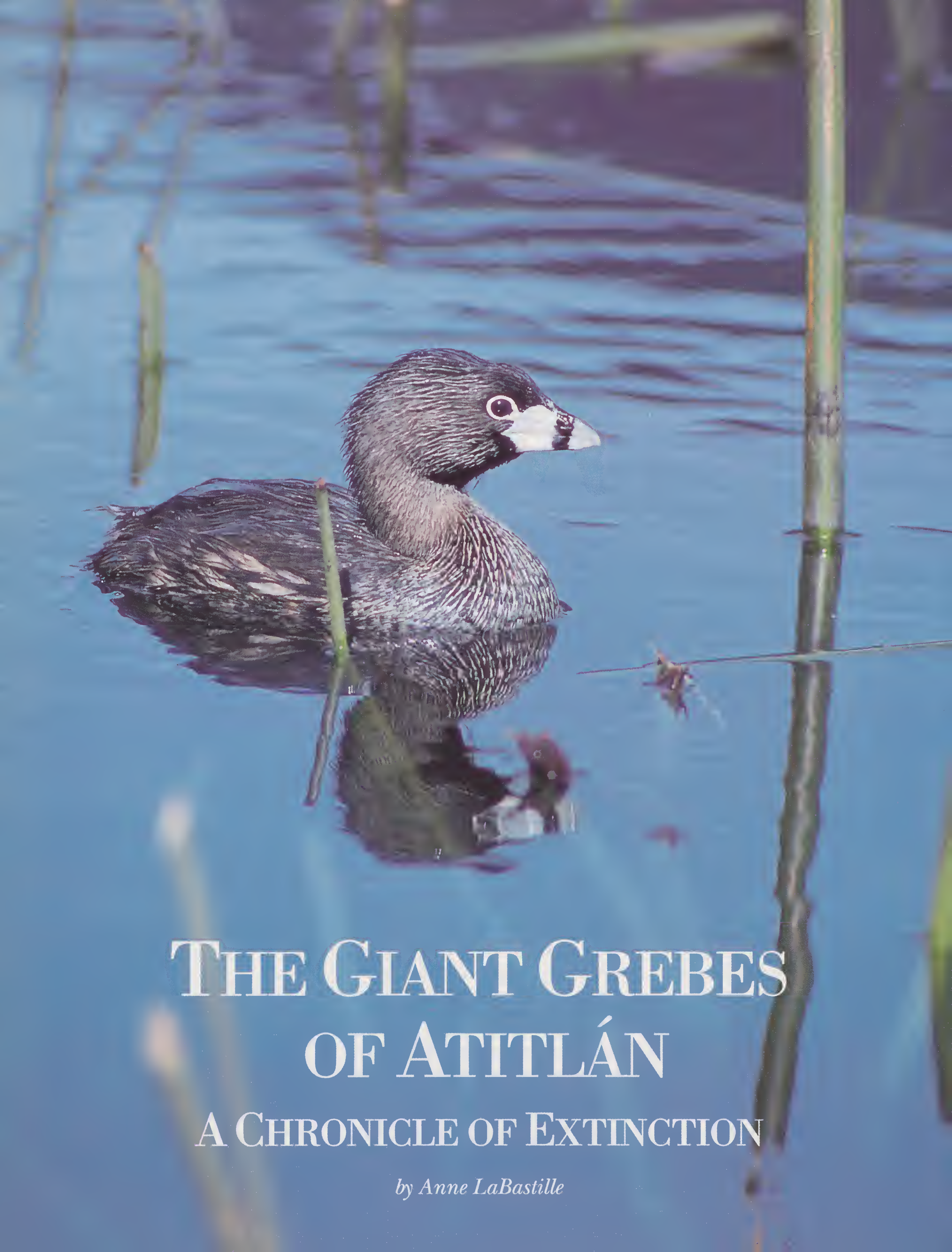


THE GIANT GREBES OF ATITLÁN

A CHRONICLE OF EXTINCTION

by Anne LaBastille

My days as a graduate student at Cornell University were far from happy. Despite the University's exemplary traditions of freedom for women, flexibility of studies, and excellence of curricula, I was miserable. There were so many required courses that seemed incomprehensible or useless to me at the time. Exams were frequent and hard. My searches through the literature in libraries often became Byzantine and boring. Winter weather was devastatingly dreary. And I was as white as an egret. Worst of all, the dormitory room where I lived was cramped and overheated. It looked out at a brick wall, and the radiator clanked all night.

Before you label me a discontented, unappreciative student, consider where I was coming from. For the previous two years, from 1965 to 1967, I had lived beside Lake Atitlán, Guatemala—one of the loveliest lakes on Earth—and studied the rare giant grebe, a species found nowhere else. Mornings, I would speed across the crystal sapphire lake surface in a small motorboat, free as the birds I'd come to observe. Afternoons, I would wander through smoky Mayan villages, endlessly charmed by the bright colors of the houses, textiles, poinsettias, and fruits, and also by the liveliness of the outdoor market. Evenings, I would write up my field notes, sitting contentedly beside a crackling fireplace in a small ranchito. Every day was like spring—warm, sunny, and dry. And I was as brown as a limpkin.

The Maya and *ladinos* alike were soft-spoken and hospitable to this odd *gringa* so intent on the giant grebes, or "pocs" as they were called by the local people. My mission of studying and trying to save these rare, endemic grebes would eventually earn me the affectionate nickname of "Mama Poc" (Mother of the Grebes).

But I had left all that to return to the university and complete my doctorate. Just about the only place I felt truly accepted at Cornell was at the Laboratory of Ornithology. There I found other students who cared about birds and would converse enthusiastically with me about the finer points of bird study. I could watch the wild waterfowl swim past on the pond just beyond the plate glass windows. Bill Dilger, one of the professors on my graduate committee, worked at the Lab. His wise counsel saved me more than once from taking a precipitous flight out of graduate school.

Little did I realize while struggling to earn my doctorate that my fledgling conservation project in Guatemala would go on to span 24 years of my professional career. Nor did I ever guess that these flightless birds would crash from a stable, healthy population of over 200 individuals to extinction in such a remarkably short span of time.

As far as I know, I was the first wildlife ecologist to document in detail a species' agonizing plunge into oblivion, and to witness most of the factors—biological, geological, political, and social—that caused this tragedy. Many ecologists and ethologists, including Dian Fossey, Jane Goodall, and George Schaller, have worked with *endangered* species, or have recorded the *final* moments of an extinction. But few if any have charted the entire course of a species from a stable population to extinction. The fate of the giant grebe bears grim testimony to the fact that a species can be lost even while being studied closely by scientists who are working to save it, if local people and governments don't have the resources to help.

But let me go back to the beginning. After receiving a bachelor's degree in Conservation of Natural Resources from Cornell University, I joined my new husband in conducting wildlife tours to the Caribbean and Central America. We saw our first giant grebes on a trip to Guatemala in 1960. But we could not find any mention of the species, let alone a description or photograph, in any field guide. A check into the scientific literature, however, revealed that two famous ornithologists—Ludlow Griscom and Alexander Wetmore—had discovered, described, named, and censused these birds in 1929 and 1936, respectively. They called the species *Podilymbus gi-*

A lone giant grebe (far left) swims on the placid surface of Lake Atitlán, the only place in the world where this flightless species lived. Author Anne LaBastille (left) often waded through chest-high water and dense reeds to study the grebes.

DAVID ALLEN (2)

gas. Griscom said that although the giant grebe was related to the common pied-billed grebe *(Podilymbus podiceps)*, the species was much larger and darker, and it was also unable to fly. In their opinion it was definitely a distinct species.

The idea dawned on me that someday I would return to Lake Atitlán, without a tour group in tow, and I would census, photograph, and write about this little-known water bird. My divorce later opened up the opportunity for me. I returned to Guatemala for a couple of months, taking up lodging in the tiny tourist town of Panajachel. It was the only village connected by paved road to the Pan American highway on the entire 75-mile shoreline, and had five or six small hotels and pensions. Around the lake at that time there were 28 private vacation "chalets," 12 Mayan villages, and a population of 38,000 people.

I cautiously edged my way around that incredible, volcano-rimmed lake each day in a leaky old boat with a cranky motor. I quickly gained a great respect for the 1,200-foot-deep body of water where every afternoon winds whipped the tranquil surface into a jumble of treacherous waves.

As part of my field work, I counted every giant grebe on Lake Atitlán and crawled laboriously through dense reeds to search for their nests. The reeds were the only place where the pocs could court, nest, roost, and hide from danger. And they also provided the principal habitat for other aquatic life, such as freshwater crabs, tiny fish, insects, and amphibians. I made my censuses on nights with a full moon when all was calm, using the taped territorial call of a male grebe. The call was invariably answered by other males.

At the end of the first month, though, I sensed that something was wrong. I'd counted only 80 pocs—far fewer than the numbers I had counted in previous censuses. I had a hunch that hunting or poaching by the Maya had caused the decline. To confirm my suspicions, I stayed another month. But I found that the Maya rarely ate grebes, because the birds were too wary to kill with simple slingshots and machetes. (Few Guatemalans are allowed to own firearms.)

Next, I hypothesized that the cutting down of reed and cattail beds by the Maya might be the limiting factor. They weave the reeds into sleeping mats and little seats for their huts. But lakeside residents had been harvesting these plants for centuries to make their simple furniture. Why should the reed cutting cause a problem now if it never had before?

It took me another month to find the culprit. I learned that the local offices of Pan American Airlines and the Panajachel tourist board had introduced 2,000 largemouth bass fingerlings into Lake Atitlán five years earlier, hoping to develop a new sport fishery. According to their plans, fishermen would fly to Guatemala on Pan Am and stay in Panajachel's hotels. No one was required to make environmental impact statements in those days, and scarcely anyone thought about ecology, or even knew what it meant.

Largemouth bass are tremendous carnivores, preying on everything from small fish, crabs, frogs, and water snakes to waterfowl chicks and swallows. They found plenty to eat in Lake Atitlán and reached record growth rates within a short time. The indigenous fish and crabs were soon decimated by the bass. Of an estimated 12 to 14 small native fish species found at the lake before the bass were introduced, only three or four remained five years later, plus four other exotic species. I saw bass weighing 12 to 14 pounds pulled from Lake Atitlán, and heard of some that ran over 20 pounds. The natural aquatic ecosystem of the lake had been turned upside down.

Local anglers and crabmen suddenly found that their catches, on which they relied for protein in their diets, had dropped drastically. Since giant grebes depended on the same food source as the local people, the birds were probably succumbing to starvation. And I surmised that the bass might also be eating the grebes' chicks.

Neither the indigenous people nor the giant grebes benefited from the introduction of largemouth bass to Lake Atitlán. A Maya at that time only earned about $200 per year and hence could not afford to buy expensive tackle or bait to catch the big bass. Furthermore, since most Maya can't swim, skin diving and spearfishing to catch bass was not an option for them as it was for wealthy sportsmen. The jaunty grebes, no larger than wood ducks, could not capture or swallow the large, finny bass. Thus this one unwise introduction had a far-reaching impact on the people and wildlife of the area.There was no way to eliminate the bass from such an enormous lake.

By now, I was determined to help save the pocs. I lengthened my visit to six months and increased my daily observations. Breeding season began. Male pocs gave out long, penetrating, braying calls to defend their territories, and shorter, sweeter, chuckling songs to communicate with females, which usually stayed invisible in the dense reeds. I recorded these vocalizations and named them the "gulping cow" territorial call and the "hen-flicker" mating call.

Each pair built a 100-pound floating nest of sodden reeds and laid a clutch of about five eggs. Since the grebe nests were always hidden in the thickest vegetation, I managed to find only 22 of them during my four years of field work. Some of my more difficult nest searches led to sunstroke, strange skin rashes, and amoebic dysentery.

After the incubation period, the cunning little black-and-white striped chicks would appear, riding on their parents' backs or trailing behind them, bobbing like ping-pong balls. I recorded a new vocalization, which led me to understand why the Maya call the giant grebes pocs. It was the soft, low *poc-poc-poc* of a parent bird calling to its chicks.

I finally left Guatemala in June and returned to Upstate New York to live in my log cabin in the Adirondacks. Yet the plight of the giant grebes stayed with me. I pondered what to do. There were two Guatemalan laws that might help, but few people knew of them and there were no game wardens to enforce them in Guatemala. One law protected all water birds at Lake Atitlán, and the other declared the lake's surface and watershed a National Park. I felt that if I could only get some grant money, I could set up a conservation campaign in the Lake Atitlán area and work to make sure that the laws were enforced.

I received a small grant from World Wildlife Fund International, and more grants later from the Smithsonian Institution, International Council for Bird Preservation, National Geographic Society, and others. When I returned to Guatemala that fall, I asked the Ministry of Agriculture for matching funds. These went to pay a new part-time game warden, Edgar Bauer, and supply gas and oil for his boat. I called the program "Operation Protection Poc," and in the years that followed we worked actively to enforce the local wildlife laws, educate the public on the need for conservation, manage the lake habitat, and establish a refuge for the giant grebes.

The World Wildlife Fund generously provided two patrol boats over the 14 years that Edgar was involved in Operation Protection Poc. And the Guatemalan government helped build the grebe refuge and paid workmen. Also, to my delight, my assistant and I were appointed as honorary wardens. As far as I know, at that time (1966) I was the only female conservation officer in all of North, Central, or South America.

During 1966 and 1967 Operation Protection Poc put up conservation posters and gave lectures in all the villages and schools around the lake. We met with reed cutters and hammered out an agreement which protected half of every reed and cattail bed each year. In places where reed harvesting was allowed, the cutters had to leave a buffer zone of uncut vegetation around any nests. This became a presidential decree in February 1968.

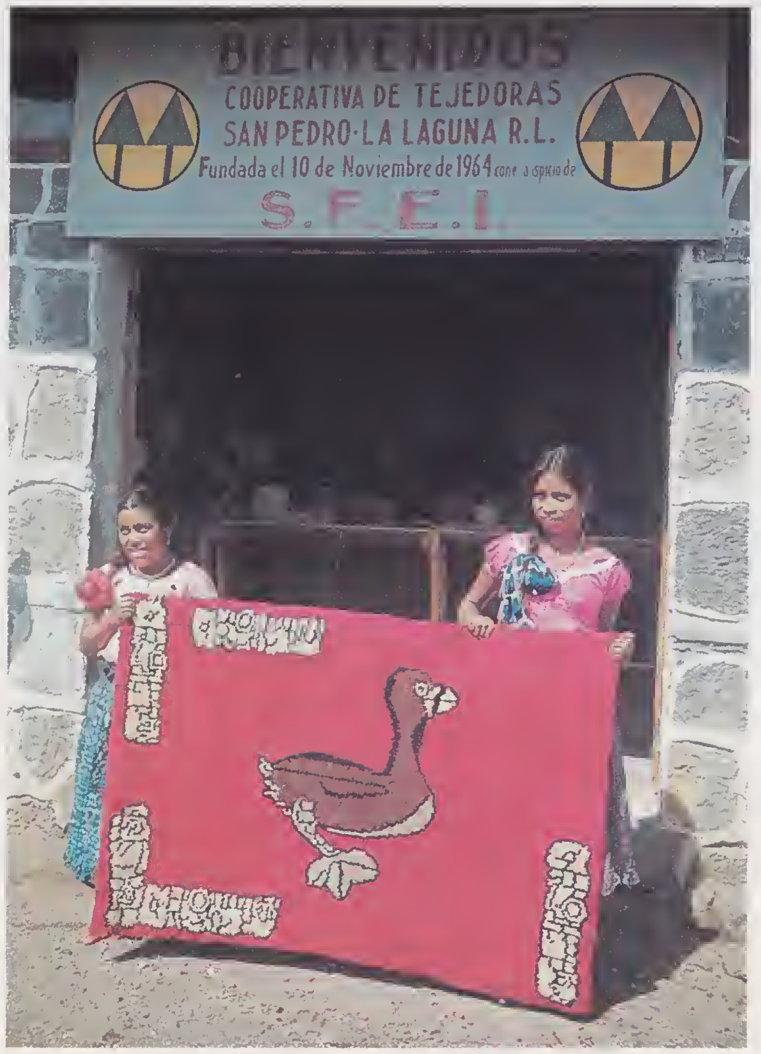
The Guatemalan Postal Service printed a handsome first-day cover and air mail stamp of the giant grebes. In two-and-a-half years, this issue grossed $123,000, though none of it went into our campaign to save the grebes. The birds also appeared as motifs in local arts and crafts, enabling the Maya to earn money from the grebes.

By June 1968, we had completed a 3-acre refuge with a visitor's center and dock near Santiago Atitlán.

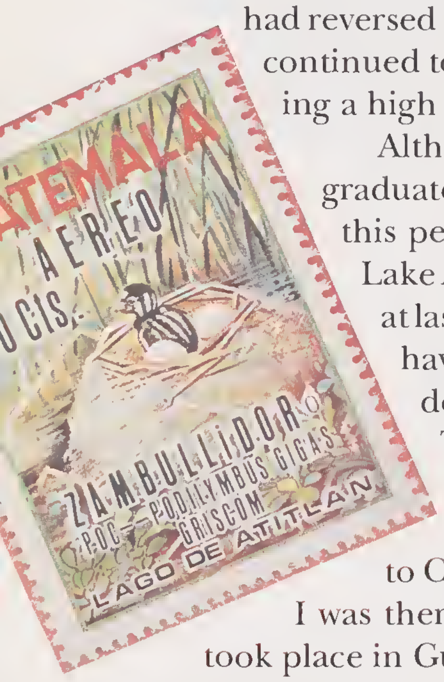
The author (above) prepares to release a giant grebe into the refuge set up by Operation Protection Poc. A Guatemalan presidential decree in 1968 required Lake Atitlán reed cutters (left) to leave a buffer of uncut vegetation around grebe nests.

ANNE LABASTILLE (2)

ANNE LABASTILLE (3)



Bass were removed from the refuge, 6,000 small native fishes reintroduced, and two pairs of giant grebes set inside. At the inauguration, our small sanctuary was officially declared Guatemala's first national wildlife refuge. And best of all, the grebes had reversed their downward trend. They continued to increase until 1975, reaching a high of 232.



Although I was registered as a graduate student at Cornell during this period, I spent all my time at Lake Atitlán doing field work. But at last the day came when I would have to return to class or abandon my plans for a degree. That's when my world of excitement at Lake Atitlán came to an end. I returned to Cornell University, and while I was there a series of sinister events took place in Guatemala.

In 1969, Edgar Bauer, my faithful colleague, warned me of plans for a hydroelectric plant at Atitlán. The lake would be used as a reservoir, and the level would be dropped 20 to 40 feet in 10 years. And three dirty rivers would be diverted into the lake water. I was sure that the fluctuation in the water level and the pollution would destroy most of the aquatic life and the crystal-clear quality of the lake water. Fortunately, a vigorous letter-writing campaign by world-famous conservationists to the president of Guatemala put an end to the project.

Then in 1976 a massive earthquake struck, killing 25,000 Guatemalans and opening fissures in the bottom of Lake Atitlán. Slowly, the water level began dropping—this time from geological forces, not socioeconomic ones. Thirteen years later, the lake was down 19 feet. The seepage finally slowed by 1990. But our refuge dried up and was planted to corn and beans long before that, and Edgar had released the captive pocs and their chicks.

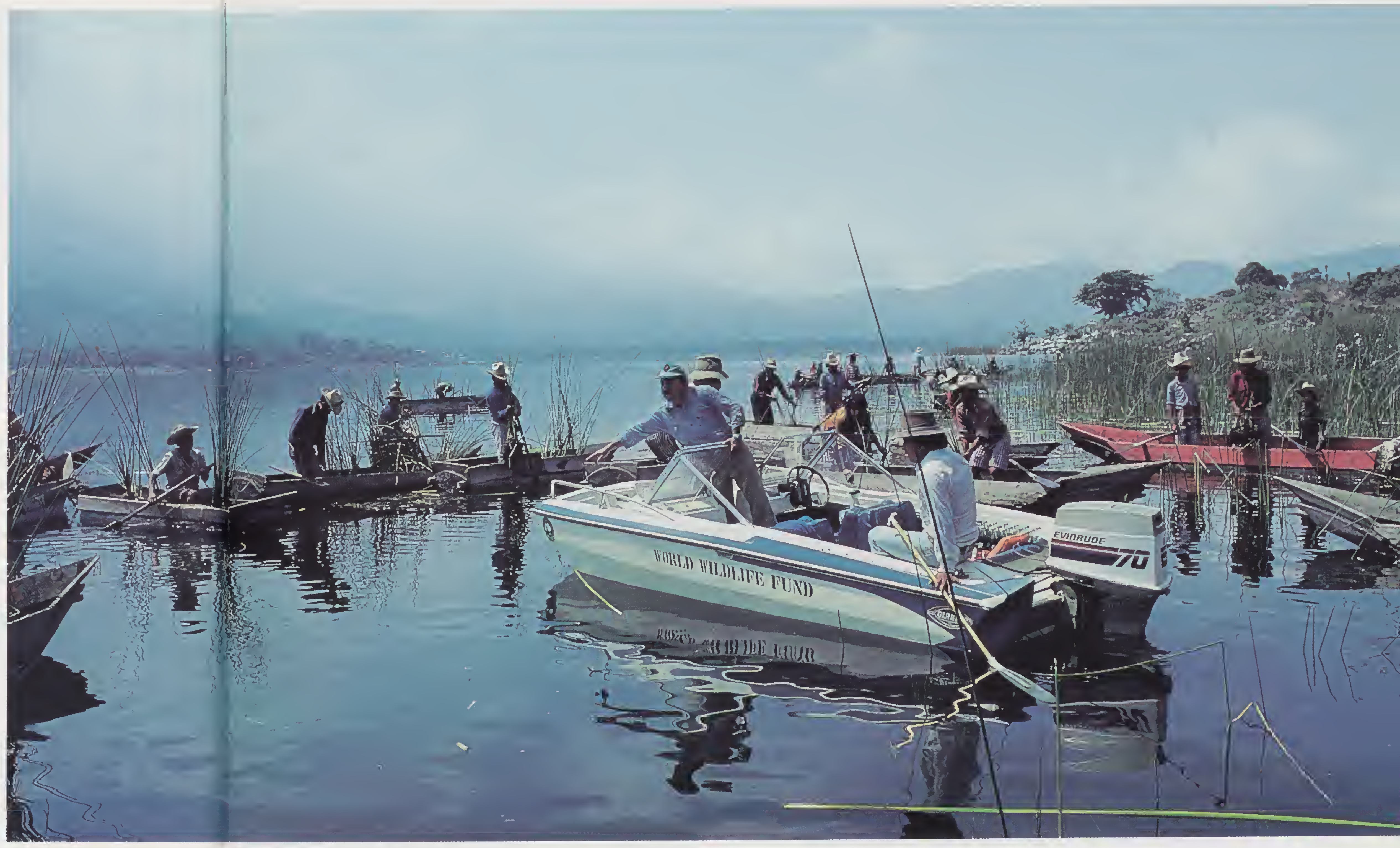
I had meanwhile attained my Ph.D., taught for two years at Cornell, and moved on to become an independent ecological consultant, author, and lecturer. I visited Lake Atitlán annually without fail and worked with Edgar to re-census grebes, measure reeds, count chalets, and monitor water quality.

By 1980, I could see that the lake was changing—fast. The human population had almost doubled. And real estate development had arrived. I counted 350 chalets, and more were under construction. Many owners had pulled out shoreline vegetation to construct beaches, docks, walls, and terraces. The presidential decree for Maya reed cutters did not apply to wealthy waterfront property owners. Moreover, a three-tower, 16-story condominium loomed near Panajachel. It was totally out of keeping with the rustic landscape and had no sewage treatment plant. Indeed, there was no regional sewage plan at all, much less a land-use plan to cluster growth centers and protect agricultural or wild lands. The lake's water was still cobalt blue, but in the big bay of Santiago Atitlán and close to the villages, it was fast becoming murky with soapy laundry water and leaching "night soil." And the giant grebe population had dropped to only about 100 birds.

That was the last time I saw Edgar. His careful reports and friendly letters of the previous 14 years ceased. The press was full of the local war between the military and guerrillas. In May 1982 someone sent me a news clipping saying Edgar had been murdered by unidentified assailants on his coffee farm late one night. Thus I lost my best friend in Guatemala, and Operation Protection Poc came to an end.

The civil strife in Guatemala raged on, and I was unable to go there for four years. The Guatemalan military took over the visitor center at the refuge and installed machine guns and a pit prison for a time. Our little sanctuary, built with so much love and cooperation, was lost. But then, no one cares about the environment during a war.

Under the aegis of the U.S. Fish and Wildlife Service and the Guatemalan government, I joined other biologists between 1984 and 1987 to check on the giant grebes again. We hoped to try a captive breeding program. Only 50 to 55 birds remained. Reed habitat had diminished by 80 percent, depriving the lake of its principal filtering mechanism and waterbirds of their homes. It was too late even for the captive breeding experiment. When only 20 pocs were left, biologist Laurie Hunter declared the species extinct. Laurie's analysis had shown that some of the remaining grebes could fly, yet were large and brownish. We would never know for sure whether the giant grebes had been overwhelmed by the more adaptable pied-billed grebes, had hybridized with them, or had simply died off from natural causes.



Thanks to publicity generated by Operation Protection Poc, giant grebes appeared as motifs on local crafts and on Guatemalan postage stamps (left). Project game warden Edgar Bauer (above center) directs a crew of local workmen as they plant reeds along the lakeshore to create more grebe habitat.

I returned to Guatemala in April 1991 and made one last thorough survey of Lake Atitlán. I counted 501 weekend chalets, many of them perched on slopes where pesticides and fertilizers from their gardens ran freely into the lake. Raw sewage flowed in from at least four towns, bands of bright green algae ringed the shore, and every morning hundreds of local women washed their clothing in the once pristine lake water. I had counted only four pocs on a survey two years earlier. This time there were none.

I would have returned to the United States in a complete depression if not for the Guatemalan government's renewed interest in Lake Atitlán. I was invited to present a forum on the conservation and sustainable development of the lake. The Governor, the Mayor of Panajachel, and other prominent Guatemalans attended, and most were enthusiastic about saving Atitlán.

Unfortunately, their concern had come too late to save the giant grebes. With sorrow, I realized that the grebes had been both biological indicators of the doom facing Atitlán, and martyrs to the country's fledgling conservation movement. They had alerted everyone to the growing ecological ruin of the lake, but the news had come too late to help them. ■

Anne LaBastille is an international advocate of wildlife conservation and the author of the best-seller Woodswoman, *and its sequel,* Beyond Black Bear Lake. *She relates the full story of her efforts to save the giant grebe in her latest book,* Mama Poc, *published in 1990 by W.W. Norton & Company, Inc.*

NORTHERN INVADER

Portrait of an Arctic Phantom

Photographs by Jack A. Barrie

Feathered symbol of the Arctic; ghostly invader from the far northern tundra; cigar company trademark—the snowy owl is all of these things and more. To bird watchers in southern Canada and the northern United States, the species is a welcome sight in midwinter when most of the resident songbirds have flown off to milder climes. Whether you see one sitting on a grassy hummock or flying low across a snow-covered field searching for prey, a snowy owl is always unforgettable.

Every few years large numbers of snowy owls descend into the southernmost reaches of their winter range, near the United States/Canada border. But on rare occasions, these Arctic wanderers have traveled as far south as California and along the Gulf Coast.

The southward movements of snowy owls are sporadic, tied closely to the boom-or-bust population cycles of the birds' favorite prey—the lemming. This small rodent is an incredibly prolific breeder. Every three or four years, lemmings reach staggeringly high population levels. During these boom periods, Arctic predators have it easy. With prey this abundant, more snowy owl pairs breed, each nest has more young than usual, and more of the nestlings survive to fledge.

Unfortunately for the owls, the good times don't last long. When the lemmings finally outstrip the carrying capacity of their environment, their population crashes, leaving hordes of snowy owls facing starvation. Many of the birds must move far south in search of food.

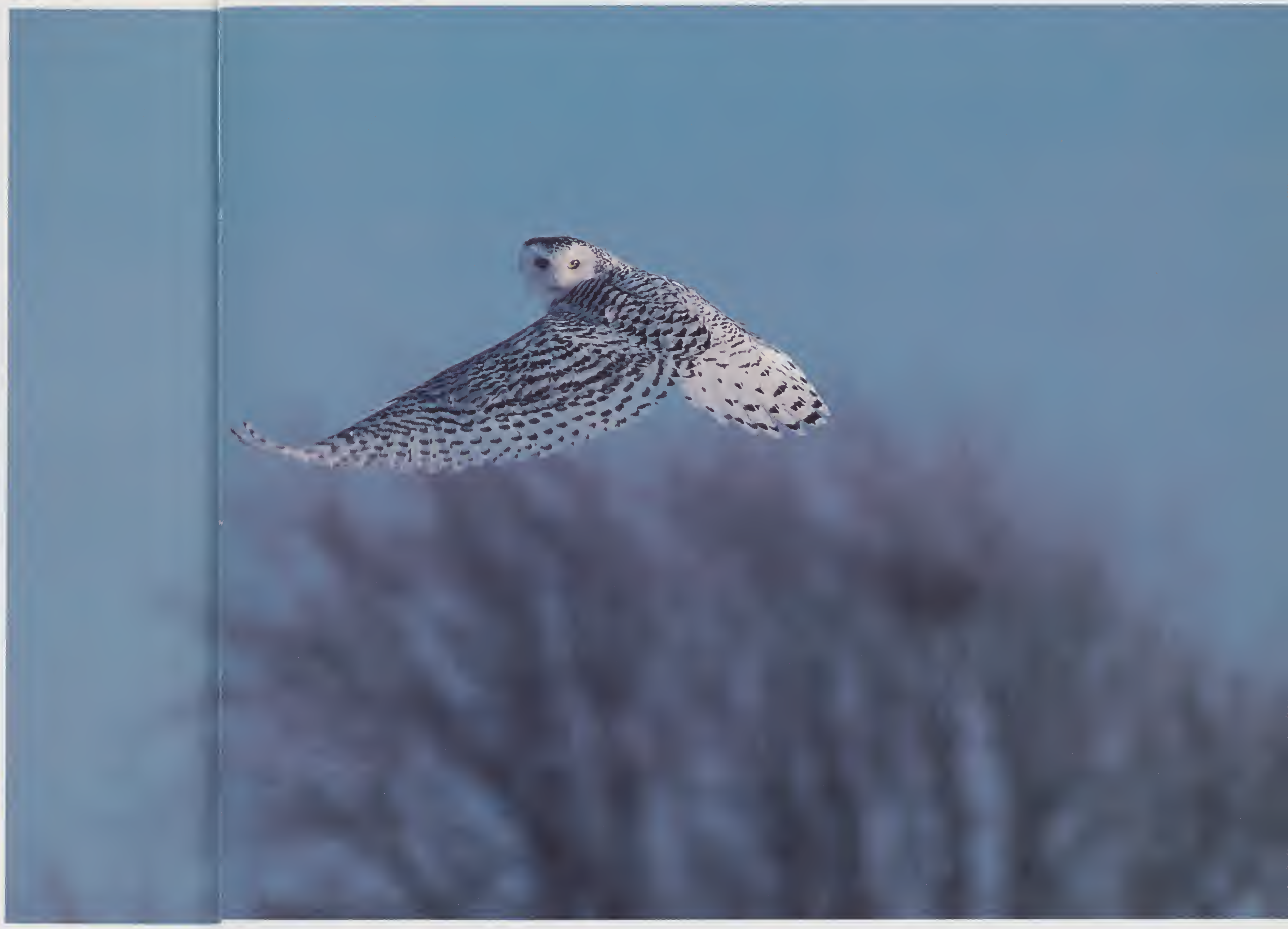
The journey southward is fraught with danger. Highway traffic, power lines, and other threats unknown on the desolate tundra take their toll. Many snowy owls never make it back to their far northern breeding grounds.

But after a couple of lean seasons the predator and prey populations in the Arctic stabilize. The lemmings begin their gradual buildup again, and the cycle continues.

Photographer Jack Barrie first became acquainted with the snowy owl while serving with the Royal Canadian Mounted Police. His beat was central Manitoba, a prime wintering area for the birds. When he later became a wildlife photographer, he returned there to document this remarkable raptor.

Barrie spent four winters photographing snowy owls in Manitoba. He often faced extreme hardships. The temperature was usually well below freezing—sometimes as low as -25 degrees Fahrenheit. On one occasion he took off his gloves for a few minutes to focus his lens and his hands froze. The frostbite took months to heal.

We are pleased to present a sampling of Jack Barrie's remarkable snowy owl photographs in *Living Bird.* — *Tim Gallagher*



Whether sitting on the ground or coursing low over a field searching for prey, snowy owls are unmistakable. During winter these large, powerful, distinctively white raptors often show up in southern Canada and the northern United States, where they frequent open places—fields, farmlands, marshes, and airports—areas similar in general appearance to their native tundra habitat.

More silent than a whisper and barely visible against a stark white winter background, a snowy owl hurtles ghostlike toward its prey.

A Birdwatcher's Cookbook

These recipes from Jonnie Fisk's popular cookbook are guaranteed to keep you warm on the coldest winter birding excursions

Though Erma "Jonnie" Fisk came to her interest in birds relatively late in life, it became a driving passion. The quintessential amateur ornithologist, she traveled the globe to study and band birds. She became an author and wrote about her adventures in an open, easy style that made readers feel she was an old friend. By the time of her death in 1990 at age 85, she had written five books.

In A Birdwatcher's Cookbook, *excerpted here, Jonnie goes off on tangents that take us far from the kitchen. Every recipe invokes the memories of places she visited and interesting people she met. As a tribute to Jonnie Fisk, who served on the Lab's Administrative Board for many years and was always a close friend, we offer this brief sampling of her cookery and her wit.*

I'm not a gourmet. I remember special dishes—some of them are in this book—because of where and with whom I ate them. Shrimp sandwiches in a small dock restaurant after a languorous morning on Florida Bay with two men with whom I enjoyed contemplating herons and spoonbills, ibis, the low-flapping pelican that nested in white-splashed mangroves. Trifle in Trinidad long before Asa Wright's Spring Hill Estate had become a nature center—when rats nibbled on the teacakes she kept shut up in an armoire, vampire bats nibbled on her donkey. Visiting birders in her good graces, residents like myself, were offered that Trifle from a bowl that held at least four kinds of cake and surely as many "spirits," so that afterward, when you saw tanagers and honeycreepers at her feeders, you didn't know whether their bright colors were real or products of her "high teas." On Tobago, where I could count eight motmots before I had lifted my head from my pillow at Eleanor Alefounder's, I can still tell you what we ate for breakfast and what the thrush hopping on her kitchen counter as I prepared our eggs was eating for breakfast, too. Roast wapiti, venison, pigeon, the crimson jams and golden sherry on our tables in Geneva, in Barcelona, in Ceylon, now become Sri Lanka (where is Ceylon these days, with elephants raising their trunks as our car eased by them on the roadsides?)—all have surroundings as important to me as my memories of their tastes.

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ILLUSTRATIONS BY LOUISE RUSSELL

CRAB CAKES

When Chan Robbins and Gladys Cole and, over weekends, a motley crew of volunteers were working the famous North Ocean City U.S. Fish & Wildlife Birdbanding Station (now become tennis courts, condominiums, and a marina), the nearest motel was 10 miles north in Delaware, and there were no convenient restaurants (or we couldn't afford them—I've forgotten which). Chan would excuse me each night (I was the lowest on the totem pole) in time to reach a small shop where we had a standing order for cooked crab cakes and a pail of coleslaw. It was a race always to get there before eight, when the shop closed. The owner became interested in us, amused by our steady diet, and tolerant of my tardiness.

You might think I would have had my fill of crab cakes. But when the North Ocean City Station closed and I moved my gear to Dottie Mendinhall's on Chesapeake Bay, I made them myself as a special treat for visitors (and me). Dottie would send me in at dusk to cook while she banded the last catbirds and white-throated sparrows. She didn't care, really, what we ate as long as she didn't have to fuss with it.

For 6 people, I would mix 1 pound of crab meat with soft bread crumbs (the amount of crumbs depended upon how many unexpected visitors we might have). This would be tossed with 2 tablespoons of oil, 2 beaten eggs, 1 teaspoon each of salt and Worcestershire sauce, and onion-soup mix that had been sitting in 1/4 cup of sour cream or sherry. I dropped this mixture by spoonfuls into hot butter and cooked the cakes until they were golden brown on each side. I could whip up biscuits (they're quick, take about as much time as the crab cakes) and serve them with honey and whatever vegetable we might have had. We would sit long over coffee until Dottie snapped her whip and we reached for the day's record sheets.

CHILI IN A BAG

Pita pockets are useful. They can be tidily packed with a variety of cheeses, salads, mixed vegetables; cream cheese and ham and chutney; bananas and peanut butter; coleslaw with carrots and raisins. Almost anything. The most imaginative is chili.

In the field, slit open the top of a bag of tortilla chips. Then, from a thermos you prepared at home, pour in your personal brand of chili. Eat this from the bag with a plastic spoon. Dispose of the bag and spoon. No mess. Hot and satisfactory.

Yes, I know this last isn't a pita pocket, but it's close.

CORN CHOWDER I

When you stop at noon, you have no leisure—the pressure is on. This applies equally to Birdathons and Big Days. Your time is more than half gone, your list not yet adequate. This is when hearty soups with vegetables, rice, lentils, beans, barley, millet are really needed. And chowders.

This one of Ginger's is special. It has traveled in kettles many miles about Connecticut for the sustenance of hawk watchers, eagle searchers, more earthbound Counters who are finding mostly jays and juncos, and for far-flung Christmas teams.

The basic recipe—for heaven's sake, at least double it—is 1/4 pound or more of bacon partially cooked and the grease poured off. To this add in whatever proportions you want of chopped onion, diced potatoes, and green peppers, sautéing these a bit in the pan, which will still be greasy. Add sliced carrots and parsley. Drain 2 or more cans of corn; blend 2 to 4 heaping tablespoons of flour with the liquid, and add this to the pan. Simmer all this—Ginger means *simmer*—then put the corn in, whatever seasoning you want, a suitable quantity of milk, heat, and pour into your kettle. If the kettle isn't full, make some more—it will be appreciatively eaten, with cheese and any variety of breads. A small jar of pimientos, chopped, and a sprinkling of parsley add Christmas color.

Spinach Squares

These were taught me by Nancy, a Hawk Expert who drives the highways in autumn with her head tilted to the sky, seeing birds that I, with my eyes nervously on traffic, miss. Our expeditions are interesting, to say the least, as she munches on one of the squares she brings along to sustain our energies.

"They're sort of a spinach sandwich," she says, skirting a big oil truck. "Maybe a quiche without the crust. What was the shape of that hawk's head on a pole we just passed? You didn't see it?" She wanted to turn back to show it to me, but the oil truck too close behind us discouraged her. "You can't just sit there daydreaming; you have to *look*. Shapes tell you as much as colors." I had been licking my fingers, not thinking about hawks.

Thaw and squeeze dry 2 packages of frozen spinach. Mix them with 1 pound of Monterey Jack or Roquefort or mild cheese (this sounded like an awful lot of cheese to me). Add 1 cup each of milk and flour, 1/2 cup of minced onion, 3 beaten eggs, and seasoned salt. Bake this at 350° for 35 minutes in a well-greased, shallow pan. Since I put garlic into everything but cakes and cookies and milk shakes, when I made this I added garlic and hot-pepper flakes—I thought her recipe too bland. And it wasn't too much cheese, after all. Different kinds of cheese produce slightly different results, too.

A more elaborate version incorporates more onion, sautéed mushrooms, 4 eggs instead of 3, 1/2 cup of bread crumbs, 1 can of cream-of-mushroom soup, 1 tablespoon of Parmesan, some pepper and basil. Sprinkle the top with more Parmesan.

Both versions can be served hot or cold, leftovers reheated in foil.

"They are easier to eat when you're driving if they have a crust," says Nancy, "especially the second one. But that's a refinement, and the crust flakes off on your jacket—you really should be parked somewhere. It's better eaten on a Hawk Count, where you are sitting all day on a hill watching through a telescope for migrating kettles." Kettles, to Nancy, are congregations of hawks, not kitchen equipment.

Roast Armadillo

I wish I'd had this recipe when I worked at Archbold Biological Station in central Florida one winter. There were armadillos all over. A researcher had brought some in to study and had not removed or roasted them when he finished his thesis. They multiplied. Other years in south Florida, I had eaten possum and raccoon that preyed upon my hen yard. I would gladly have decimated the abundant armadillos that dug up any flowers I planted—even my doorstep pots—trying to make my small quarters at Archbold a home. Those darned critters dug up everything, rustled in the bushes along paths I walked at night, scaring me. The fire-alarm system in my cottage wailed if I even singed a piece of toast or a visitor smoked his pipe, so I learned early not to cook bacon or pork chops, but to subsist on tuna and cold chicken. If I had known armadillos were edible . . . .

Diane Weyer of Belmopan, Belize, provided this recipe. The animals uprooting her gardens there were tapirs, not armadillos. I'll have to find out if she ever cooked tapir stew. Or paca. She doesn't answer letters; the Belize postal service eats them, maybe.

Put 1/2 a cleaned armadillo (it is a common meat in Belize) in a roasting pan with 1/2 inch or so of water and some salt. Cover the pan, and roast the meat until it is cooked through but *not* tender. (I don't know how you tell this; it would depend on the size of the animal. I can't advise you.) Diane uses an oven temperature of 450° but says some use 300°. Remove the cover, and add more water to the pan, if it is needed. Stick about 1 dozen cloves in the roast, sprinkle it with white pepper to taste, and smear it thoroughly with honey. If you want to be fancy, you can put peach halves or pineapple slices on top. Continue cooking it until it is very tender. Use lots of red wine. If I get back to Belize (or Archbold), I'll try to work out more explicit directions.

CORNELL LABORATORY OF ORNITHOLOGY CHEESE LOGS

May not be entirely hot by the time you manage to get one, but they will be warm and so good that you won't mind. They are sort of a cheese ball to begin with—just treated differently.

Cream 1/4 cup of butter with 1 cup of grated Cheddar, 1 cup of flour, salt, red pepper (important), 1/4 teaspoon of curry or onion, 3/4 cup of chopped walnuts. Shape this into logs, chill them thoroughly, slice them thinly, and bake at 325° for about 10 minutes. Like cheese balls, these keep well and can be frozen. Reheat them slightly before serving, if you can't pass them around straight out of the oven.

RITA'S ICED PUMPKIN BARS

Rita has a ballet dancer's figure, a fine sense of color, a husband and three children, runs a hairdressing shop. And any holiday or celebration finds appropriate goodies, flowers, and punch on her counter. "Certainly I like to cook," she says, snipping by my ears. "Would you like the Pumpkin Bars you are eating in your book? We are cross-country skiers, not bird-watchers, but we often see birds in the woods and stop to look at them. The recipe makes a *lot*—you might cut it in half.

"Beat four eggs with two-thirds cup of sugar, one cup of oil, one sixteen-ounce can of pumpkin until fluffy. Then beat in two cups of flour mixed with two teaspoons each of baking powder and cinnamon, one teaspoon each of salt and baking soda. Bake this in a large pan [15" x 10"] at three hundred fifty degrees for thirty minutes. Cool and frost."

I had just come from the dentist and protested feebly.

"But of course you frost it—that's part of it," she said sternly. "A cake without frosting is like a kiss without a squeeze."

So that's what you should remember about all these sweet foods—the squeeze that makes for happiness.

PECAN PIE

The first year I drove to Florida, all my goods and chattels and birdbanding equipment in my station wagon, to live in unknown territory, in an uncertain future, I had been urged to stop at the Savannah River National Wildlife Refuge and convey greetings to the then-manager Pres Lane and his wife. The road I was on took me through their watery wilderness, embarrassingly about lunchtime, although I parked and walked wherever I could find paths in order to delay a little. The Lanes took me in, pressed a full second-day Thanksgiving dinner of turkey hash and pecan pie on me, gave me a royal tour of the acres of waterfowl they guarded. Turkey hash I am an old hand at. But pecan country was new to me, and the pie. They sent me off with a generous slice. It couldn't be simpler.

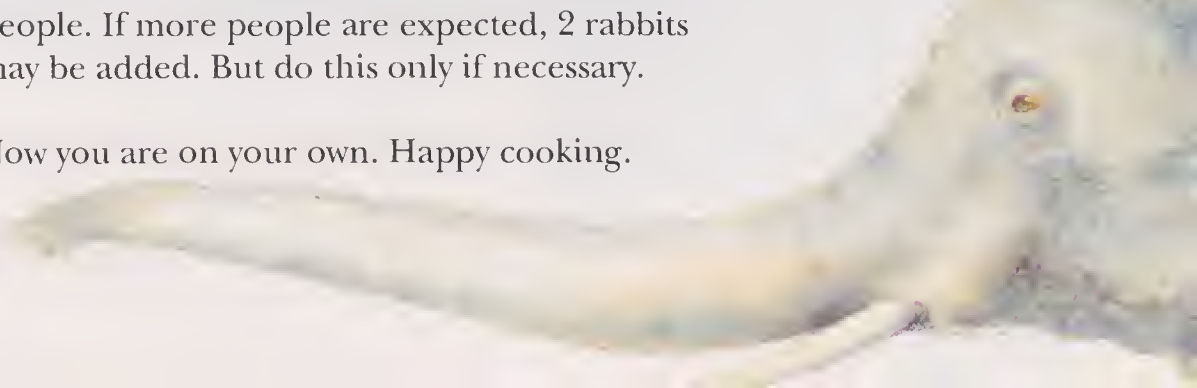
Mix 1 cup each of sugar, corn syrup, butter, broken pecans. Add 3 eggs, 1 tablespoon of flour, salt, vanilla. Put this into an unbaked pie crust, and bake at 325° until it is brown. It couldn't be better.

ELEPHANT STEW

If ham is too ordinary, too plebeian, for your taste, you can fall back on this.

Cut 1 medium-sized elephant into bite-sized pieces. (This should take about 2 months.) Add enough brown gravy to cover. Cook for about 4 weeks at 465°. Will serve about 3,800 people. If more people are expected, 2 rabbits may be added. But do this only if necessary.

Now you are on your own. Happy cooking.



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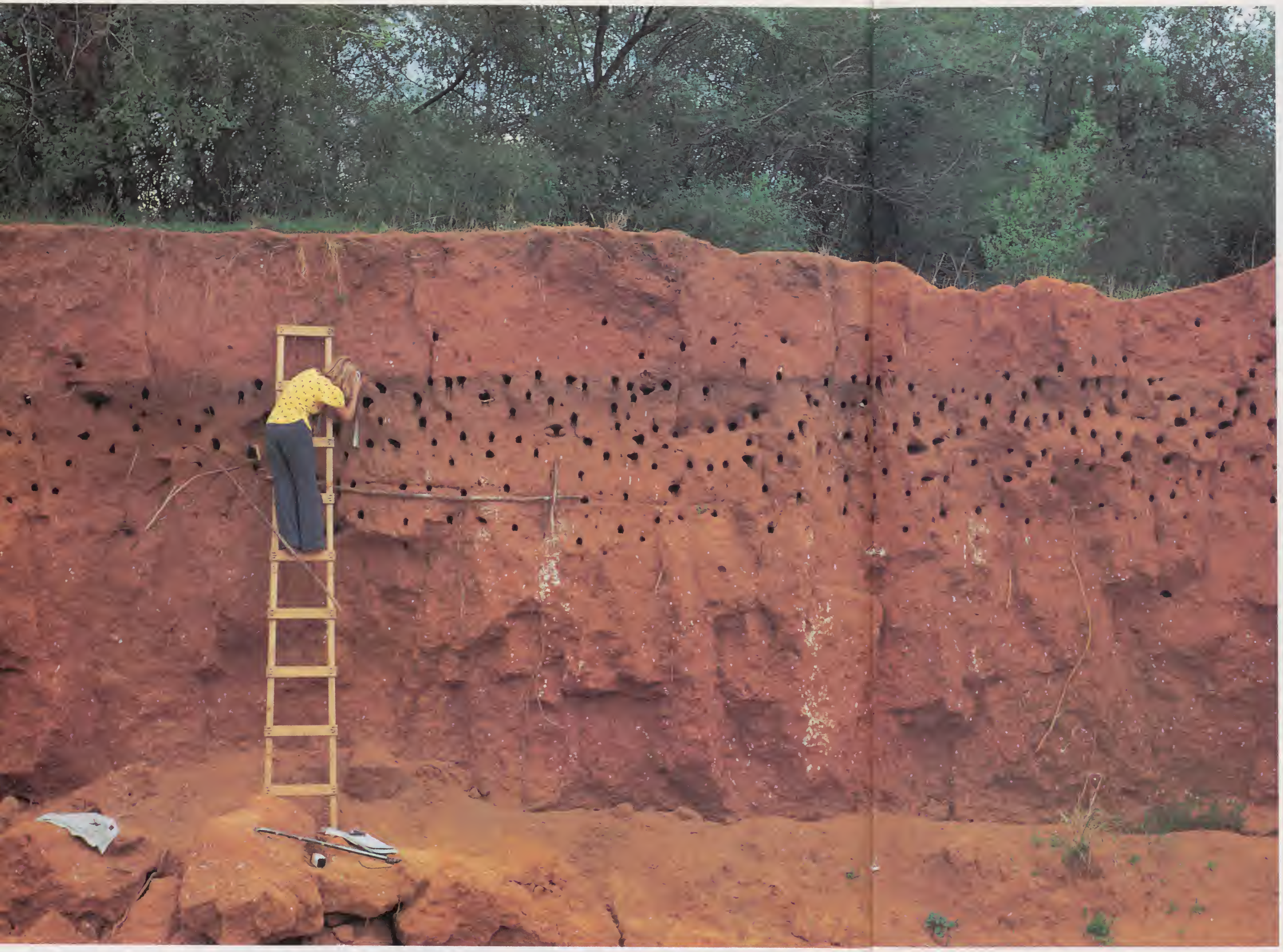

Family Ties

by Natalie J. Demong and Stephen T. Emlen

For Kenya's white-fronted bee-eaters, raising offspring is a family affair

White-fronted bee-eaters nest in cliffside burrows. At left, Natalie Demong checks on a bee-eater family. Right, the view through her bird burrow periscope.

The great Rift Valley, Kenya, East Africa. We are seated in a homemade blind of rough-cut lumber and burlap. The scene before us is simultaneously colorful, chaotic, frenzied, and filled with a cacophony of sounds. From our perches, we peer out at a Swiss-cheese wall of holes excavated into a cliff in Lake Nakuru National Park. It is late afternoon, and the setting sun casts a golden color across the cliff face which is alive with activity. Two hundred birds known as white-fronted bee-eaters have congregated for the 90-minute period of socializing that precedes their roosting inside their burrows for the night.

We are animal behaviorists on leave from Cornell University, but

BHL

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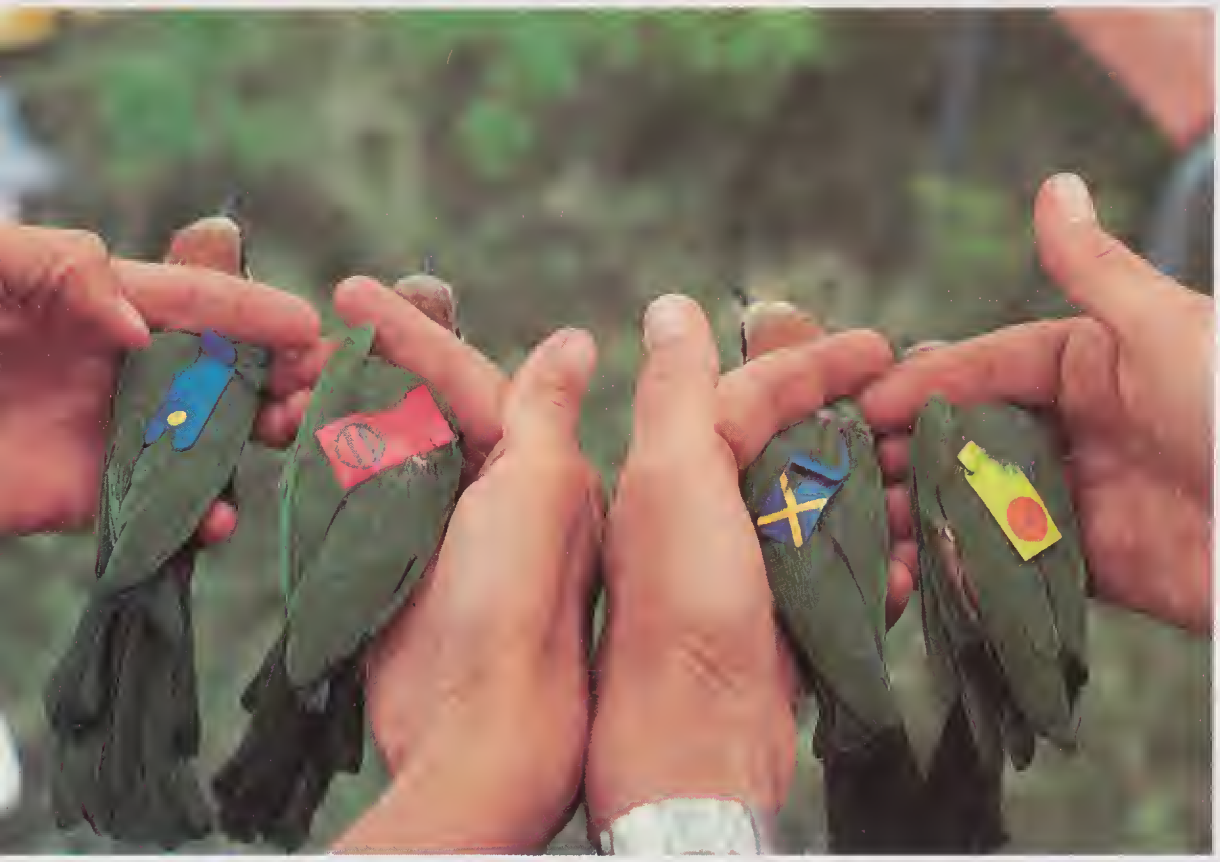
NATALIE J. DEMONG (2)



Do adult "helpers" assist breeding bee-eater pairs? Researcher Stephen Emlen (top) marked hundreds of birds with wing tags (bottom) in order to unravel the complexities of bee-eater society.

at this moment, Ithaca, New York, is the farthest thing from our minds. So much is happening before us that we can't absorb it all. We witness intriguing social interactions while strange avian calls assault our ears. The topography of the curving river bank and the nearness of the cliff on the opposite shore help to magnify the excited noises so that on this particular night, as the colony gears up for the breeding season, we experience a decibel level of sound that is only somewhat less than deafening.

Correlating sight with sound, it is obvious to us that some of the bee-eater vocalizations denote aggression, others indicate friendship or an invitation to enter a burrow; still others signal a bird's intention to leave the colony in search of an alternate roost site. Some birds serve as "sentries," sitting at burrow entrances, facing out, passing judgment as to which individuals are allowed in and which are actively excluded. Not infrequently, we see one bird yank another backwards out of a tunnel by the tail and then aggressively chase it away. On a friendlier note, we also notice small clusters of birds perched side-by-side, tête-à-tête, excitedly quivering their tails in unison.

We had initiated our study of bee-eaters because we were interested in the phenomenon of altruism. Biologists define altruistic behaviors as actions that benefit others while exacting a cost from the performer. Individual acts of heroism and charity—soldiers dying for their country or childless families adopting infants—are examples of human altruistic behavior. In nature such behaviors pose something of an evolutionary paradox: the theory of natural selection predicts that behavior should help individuals to survive and reproduce. How can altruistic behaviors be maintained in a population if natural selection operates against them?

White-fronted bee-eaters were good subjects for our study of altruism because they were suspected of having "helpers-at-the-nest": adult birds that aid in rearing the young of others. Helping typically involves both defending the nest and provisioning the nestlings. Although helping behavior is most common in tropical birds, several North America species including acorn woodpeckers and Florida scrub jays regularly have helpers.

In order to make sense of the bee-eater behaviors we were witnessing and to confirm the existence of helping, we needed to be able to identify each bird. But even male and female white-fronted bee-eaters are, to human eyes, indistinguishable in size and coloration. Both sexes sport green backs, blue undertail coverts, and red throats in addition to their white caps and bibs. We therefore marked our study population with individually recognizable wing tags. Then, using binoculars, telescopes, and field tape recorders, we watched and recorded the birds' behavioral interactions. We also followed their nesting attempts deep within the cliffs using a specially designed piece of equipment consisting of a long tube equipped with lenses, mirrors, and a battery-operated light—a bird burrow periscope, if you will. At night, by the light of kerosene pressure lamps, we struggled to transcribe the data and make sense of our findings. Now, years later, thanks to the help of our co-worker Dr. Peter Wrege, numerous field assistants, and thousands of hours of observation, we have come to understand a social complexity we never dreamed existed when we began our study of this very gregarious species.

White-fronted bee-eaters are thrush-sized birds that really do eat bees, but only after an elaborate procedure in which they first de-sting each insect by whacking and rubbing the poisonous piece of anatomy against a perch. In addition to bees and wasps, adults eat a wide range of flying insects, sallying out to catch their prey one at a time, like flycatchers. Each bird forages in its own specific area, generally within a few kilometers of the colony. Members of the same social group occupy adjacent and partly overlapping feeding areas, and all of them defend the feeding territory from outsiders.

We rapidly learned that our bee-eaters did indeed exhibit helping behavior. Half of all the nests we studied had extra birds in attendance. While most such nests had one or two helpers, others had as many as five. In fact we found that bee-eater helpers play a major role in almost every aspect of nesting except the copulatory event itself. Even before breeding gets under way, they aid in digging the nest chamber, a task that typically takes 10 to 14 days of hard work. They also help feed the breeding female during the week when she is energetically burdened by egg production. Later, after the eggs have been laid, helpers take full turns incubating the clutch.

Most important, however, is the role that helpers play in bringing food to the nestlings. Using our burrow periscope, we discovered that fully half of all nestling bee-eaters starve to death before the time of fledging! By keeping track of the number of fledglings produced at nests with differing numbers of helpers, we were able to show that helpers really make a difference. Pairs with a helper fledge roughly twice as many young per nesting attempt as do pairs that are unassisted. The food brought by helpers significantly reduces the starvation rate, greatly improving a breeder's chances of successfully rearing young. Thus the assistance provided by the extra birds is very real.

But a perplexing question remained: Do the helpers benefit from these seemingly altruistic actions? After all, bee-eater helpers are sexually mature adults; many already have mates. They occupy their own foraging areas and can readily dig new nesting chambers at the colony. They could be breeding themselves instead of helping other birds. But they forgo reproduction and raise no young of their own—in human terms, they leave no heirs, at least for the breeding seasons in which they help. This is the primary "cost" of helping in this species. Yet natural selection should favor individuals that behave in ways that lead them to produce more offspring, not fewer.

We wondered whether helpers receive subtle benefits that might offset this cost. We therefore examined our data to see whether helpers gain valuable experience that, later on, makes them better breeders, or whether they form friendships with the young they care for, such that these birds help them in later years. Our data showed that neither of these delayed benefits is important to bee-eaters. But another, more indirect, benefit is crucial. The secret to understanding it lies in the family ties of bee-eater society.

Bee-eater society revolves around the family. Over several years, as we monitored nesting attempts and banded nestlings, we slowly learned the genealogical relationships of virtually all members of our study population. Unlike the young of most North American songbirds, maturing bee-eaters do not disperse, migrate, or otherwise break contact with their parents. Instead, they continue living in the same "neighborhood," sharing the family foraging territory and visiting and roosting with various family members at the colony. Bee-eaters live for five to six years, so that three, and sometimes four, generations of family members overlap. Thus individuals interact regularly not only with their parents and grown siblings, but also with their grandparents, uncles and aunts, and nephews and nieces. In many ways bee-eater society strikingly parallels the organization of traditional human societies. Colonies are like early villages; they are clusters of 15 to 25 extended family clans.

When a white-fronted bee-eater takes a mate (generally at one to two years of age), the female leaves her family group and joins her partner's family. Anthropologists would call this a patrilocal marriage system. It creates a profound difference in the lives of the two sexes: whereas males live their entire lives within a social network of close relatives, paired females are typically unrelated to the rest of their "adopted" clan. In human terminology, they are in-laws.

When we looked at who the helpers were and whom they aided, it became clear that helping was a family affair. Helpers most commonly assisted their parents, a parent who had re-mated, a son and daughter-in-law, or a brother and sister-in-law. From the helper's viewpoint, the young being reared were its younger brothers and sisters, half-siblings, grandchildren, or nieces and nephews, respectively. Bee-eater helpers don't help just anyone—they typically assist close kin. Close genetic relatives share a common ancestry and therefore are highly likely to possess many genes in common. Consequently, the indirect benefit of helping is an indirect genetic benefit. A helper that rears its relatives helps itself by indirectly contributing to the perpetuation of its own genetic make-up.

By this logic, a helper will benefit most if it preferentially lends its services to the closest kin available. The complex nature of bee-eater extended families provided us with a unique opportunity to test this prediction. In good years in the Rift Valley, two or three pairs of birds belonging to the same family may breed simultaneously. In such circumstances helpers can be seen as having a choice of potential recipients. We analyzed over 100 such cases and found that helpers overwhelmingly aided the most closely related breeding pair available—94 percent of the time. Our results

S. T. EMLEN

THE EVOLUTIONARY DILEMMA OF ALTRUISM

Altruism, at its most basic level, is the unselfish aid of one individual by another. We humans pride ourselves on being an altruistic species. Every one of us can cite personal examples of taking risks to help others in danger, of giving financially to help those in need, or of donating time and energy to causes we feel are worthy of support.

Do nonhuman animals also display altruistic behavior? Biologists restrict the term altruism to behaviors that are detrimental to the performer but have beneficial effects on the recipient. By this definition, many animals do display altruism. Consider the honeybee scout that sacrifices its life to protect its colony by stinging an intruder; the dwarf mongoose female that undergoes pseudopregnancy in order to produce milk to nourish another's offspring; the white-fronted bee-eater helper that forgoes breeding itself and instead spends two months provisioning and defending young that are not its own. Each of these individuals qualifies as an altruist, provided that its actions are truly costly to perform.

The secret to understanding the continued existence of altruism lies in the realization that there are two potential benefits to the donor from such actions, although these benefits are often hidden. One is that the initial cost to the altruist is reimbursed later in life by others; such altruism is driven by reciprocity. Another is that the recipients of the aid are close genetic kin that share many genes in common with the donor; by its actions, the altruist is indirectly helping itself (that is to say, its genes). These two benefits may operate independently of each other; if they occur simultaneously, their effects are additive.

Evolutionary biologists now realize that measurements of the costs and benefits of any particular behavior must be measured over the entire lifetime of the individual and must incorporate the effects on genetic relatives. Studies of helping behavior in birds and mammals have shown that not all helping should be classified as altruism; in some cases helping incurs no cost. When it is costly, helping virtually always is directed toward close genetic relatives; the hidden benefit is largely through the second route described above. By contrast, in humans, much observed altruism occurs between unrelated individuals. Reciprocity presumably plays a major role in such interactions. Human cultures promote reciprocity both by providing material and status rewards for individuals who behave altruistically and by collectively punishing "cheaters" who fail to reciprocate what they "owe" to others.

Although these realizations have helped biologists to understand how behaviors such as helping and even sacrificial death may evolve and be maintained in populations, they in no way detract from the reality of the altruistic acts themselves. Humans and animals alike are known to perform acts which put them at risk or which otherwise are costly to perform. The essence of altruism is that individuals take such risks and incur such costs in order to benefit others in their social group. —*N. D. and S. E.*

indicate that bee-eaters are able to recognize and discriminate between different family members on the basis of kinship.

In contrast, in-laws rarely help their mate's family. If a pair opts not to breed and the male joins as a helper at a relative's nest, the female may roost with this breeding group at night, but she doesn't lift a feather to help rear her in-laws' young, which, of course, are unrelated to her. Instead, she may even temporarily stop roosting with her mate and begin helping at a nest elsewhere in the colony. In each such case, a check of our genealogical records confirmed that the female had returned to her own natal family and offered breeding assistance. After helping her relatives with their nesting attempt, she returned to her mate. Thus in-laws that have paired into new families have not lost the ability to be helpers; they simply don't express the behavior when the potential recipients are non-relatives.

Of course, helping to rear close relatives isn't genetically quite as good as rearing your own offspring, but it isn't a bad option. The savannas of Kenya's Rift Valley can be a harsh environment. Even during the breeding season the weather is unpredictable and the rains unreliable. When rainfall is sparse, insect food is scarce—for nestlings and adults alike. In bad years, in particular, bee-eater pairs without helpers have very poor nesting success. Thus, constraining environmental variables make it profitable for some family members, especially younger birds, to stay at home and help rather than risk what would be almost certain breeding failure.

One solution to the evolutionary paradox of altruistic helping behavior is to assist close genetic relatives in breeding. Viewed in this way, helping is a more selfish strategy than it first appears. In fact, for white-fronted bee-eaters, you might say that kinship takes the altruism out of altruism. ■

Stephen Emlen is a professor of animal behavior at Cornell University and a former member of the administrative board of the Laboratory of Ornithology. He is also a research fellow of the Smithsonian Tropical Research Institute in the Republic of Panama where he has begun a study of sex-role reversal in the polyandrous wattled jacana. Natalie Demong photographs and assists in these field endeavors. When confined to the environs of Ithaca, she works as a travel consultant. Demong and Emlen share no genes in common, but she is related to his in-laws.

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RITA SUMMERS

Like friendly neighbors on a summer evening, white-fronted bee-eaters socialize outside their burrows before roosting for the night (left). As in traditional human societies, generations of bee-eaters overlap and interact; helpers-at-the-nest preferentially aid their closest kin. Above, bee-eaters really do eat bees . . . this one, however, is making a meal of a butterfly.

MAY THE BLUEBIRD OF HAPPINESS NEST IN YOUR YARD

by Richard E. Bonney, Jr.

Backyard naturalists can help preserve bluebird populations—and at low cost

Nothing is cheap these days, including wildlife conservation. We've all heard about the millions of dollars spent on the California condor reintroduction program, and we all know that millions more must be spent on habitat preservation and restoration if wildlife populations in general are to have any real future on this planet. Thinking about it can get pretty depressing.

Yet there are ways that birders and backyard naturalists can help preserve bird populations at low cost. Consider the case of the eastern bluebird.

Around the turn of the century, this species was among the most common in the East. E. H. Eaton, in his 1914 *Birds of New York,* said "the bluebird is one of our familiar summer birds, frequenting the orchard and garden as well as the edges of open woodlands." But how times change. By 1960 the eastern bluebird population had crashed, in many regions becoming so scarce that most people knew the bird only from pictures.

Why? A combination of factors, as usual. For one thing, as the vast farmlands of past years reverted to forest, a tremendous amount of the bluebird's favored habitat disappeared. Equally as important, even where suitable habitat still existed, it was frequently devoid of nest sites. Dead trees and wooden fence posts had been removed as small farms gave way to large operations specializing in unending fields punctuated with metal fence posts. Furthermore, many of the potential nest cavities that remained had been snatched by aliens from Europe—house sparrows and starlings, which are more aggressive than bluebirds, and which had been increasing their range throughout North America ever since they arrived here in the late 1800s.

But the bluebird did have one important characteristic working in its favor: familiarity. This was no ordinary bird, one more species to become lost in the rush toward progress. No, the bluebird was the bird of happiness, a creature that had somehow become a symbol of love and hope.

And so in 1977, when a retired biochemist named Lawrence Zeleny called the bluebird's plight to the attention of the country, people responded. Zeleny sounded the trumpet in an article entitled "Song of Hope for the Bluebird," published in *National Geographic.* "During the past 40 years, the population of the eastern bluebird may have plummeted by as much as 90 percent," he wrote. "Its extinction remains a real possibility."

Then Zeleny spelled out the hope. People should build nesting boxes, he suggested, and set them out on bluebird "trails." The boxes should be of just the right size and shape to attract bluebirds yet exclude other species; the trails could consist of any number of nesting boxes spaced about a hundred yards apart, in locations where they could be monitored on foot, by bike, or by car. Finally, intruding house sparrows should be evicted, and the boxes should be cleaned in the off season. "The 85 boxes of our Beltsville [Maryland] bluebird trail have yielded hundreds of healthy fledglings," he wrote, "dramatic evidence that the most practical way to help these songsters is to supply them abundantly with nesting boxes."

Zeleny's trail was not the first. The bluebird trail concept originated in the 1930s with Thomas E. Musselman, who established several trails comprising more than 1,000 boxes along country roads in Adams County, Illinois. Musselman even attempted to obtain widespread public participation in bluebird conservation through a 1934 article in *Bird-Lore* called "Help the Bluebirds." But *Bird-Lore* was not as accessible as *National Geographic,* and when Zeleny's article was published, the volume of mail from readers requesting additional information was overwhelming—to the point that a bluebird committee, sponsored by the Audubon Naturalist Society of the Central Atlantic States, had to be formed to help him respond.

And that was just the beginning. Under Zeleny's direction, the committee soon evolved into the North American Bluebird Society (NABS), complete with officers, members, dues, and a small journal, *Sialia,* named after the bluebird's genus. "The Society will work," said the first issue, "within the bounds of effective conservation, to study those obstacles impeding bluebird recovery; to publish results of those studies; to promote ideas and actions which might reduce the effect of those obstacles; and to obtain a more complete knowledge about bluebird ecology."

Today, the NABS stands as an excellent example of what a small group of dedicated conservationists can accomplish. For 14 years the society has grown and flourished. Membership has increased from a few hundred individuals in 1979 to nearly 5,000 in 1991, and *Sialia* has continually grown in size and quality. But more importantly, the group has served as a catalyst for the hundreds of bluebird trails that have been developed throughout the continent under the aegis of scout and 4-H groups, nature clubs, and Audubon chapters. NABS has provided these groups with information about construction, placement, care, and maintenance of boxes and results of bluebird research. And best of all, during that time populations of the eastern bluebird have recovered throughout most of the species' range.

Now, some ornithologists have questioned whether the bluebird really recovered because of the nesting opportunities afforded by bluebird trails. Bluebirds are particularly susceptible to cold weather in winter and early spring because they're among the first birds to migrate north and to nest. Numerous occurrences of massive bluebird die-offs in winter and spring have been recorded, leading some to wonder whether warmer weather in the past decade might be the true cause of the bluebird's recovery.

John Sauer and Sam Droege, biologists with the U. S. Fish and Wildlife Service, addressed this question in a recent analysis of Breeding Bird Survey data. "[We] suggest that climatic events have been a dominant force in affecting population trends of eastern bluebirds over the period 1966-1987," they wrote in *The Wilson Bulletin.* But they also noted,"Unfortunately, we do not have information on regional changes in nestbox availability and cannot determine if a correlation exists between changes in nestbox abundance and bluebird population changes."

Even if nest boxes have not been the only factor in the bluebird's recovery, an important fact remains. Building nest boxes, placing them in the field, monitoring them, and watching their young inhabitants grow and fledge is one of the most exciting and educational experiences available to birders. And the North American Bluebird Society and its journal provide a terrific forum for anyone, young or old, to present the results of their findings and research regarding bluebirds or, for that matter, any of the other cavity-nesting birds.

So, as the days begin to lengthen and spring appears on the horizon, why not get ready to start a trail of your own? Or if that seems too ambitious, just try placing two or three boxes in your own yard. You may be surprised how easy it is to bring the bluebird of happiness to your home. ■

Information on building, placing, and maintaining bluebird and other nest boxes is available from the Lab of Ornithology. Please send a self-addressed, stamped envelope to: Education and Information Services, Dept. N3, Cornell Lab of Ornithology, 159 Sapsucker Woods Road, Ithaca, New York 14850.

For more information on the North American Bluebird Society, send a business-sized self-addressed, stamped envelope and $1.00 to: NABS, Box 6295, Silver Spring, Maryland 20916.

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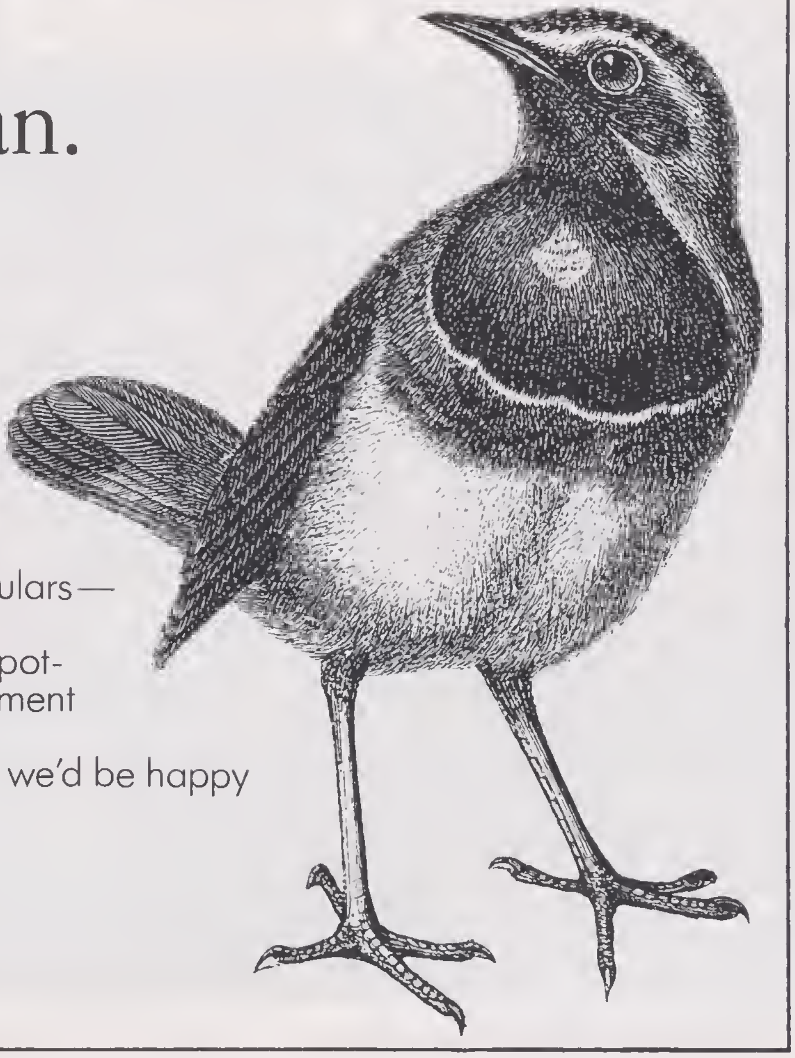

MYSTERY ON MILL POND

by Jack Connor

Professional ornithologists sometimes accuse birders of being uninterested in birds beyond their identification—of looking at each new bird only long enough to name it. "Watch what it does," we are told. "Learn how it lives in the world." What our critics rarely mention is how difficult it is to study and understand bird behavior in the field.

Learning to identify birds is like climbing a ladder. Progress is direct. One year you learn how to tell a whimbrel from a glossy ibis, the next year you are distinguishing greater yellowlegs from lesser yellowlegs, and by the third year you are aiming your scope at every shorebird flock on the mudflats hoping to discover a sharp-tailed sandpiper hidden among the pectorals. The longer you work at identification, the higher you stand and the farther you can see.

Studying bird behavior, on the other hand, is like falling through a fun house floor. All is dark and quirky, there's no telling which way leads to enlightenment, and the longer you keep at it the dumber you feel.

Last February I was standing on the shore of Mill Pond a mile from my house, idly admiring the diving style of the hooded mergansers there. They descend like pearl divers, straight down with no splash, their tails and feet showing for a moment before they disappear, and they bob back up like bathtub toys, almost popping right out of the water. Why don't any of them come up with a fish? I got to wondering. Were they preying on fish so small that they ate them before I could see them? Were they swallowing their prey under water? Or is hunting on a freshwater pond such an unrewarding enterprise that most dives are unsuccessful?

TIM FITZHARRIS

Is this female hooded merganser about to get mugged by a pirate gull?

I stepped closer to the water's edge, propped my bins on the top of the fence for a better view, and noted that the flock of 26 hooded mergansers I was watching seemed to be centered around a ring-billed gull that was paddling slowly toward the middle of the pond. Why would a flock of mergansers follow a gull around? I wondered, just before a female popped up with a 3-inch fish in her mouth, and the gull went right at her, flapping heavily, head and bill lowered like the backswing on a bolo punch. The duck took off high, circled the flock twice with the gull 5 yards behind, and dropped the fish. The gull braked, hovered, splashed down, and swallowed it in one gulp.

The gull flew right back to join the flock, and now I could see that it wasn't the mergansers who were surrounding the gull; it was the gull who kept itself at their (moving) center. The ducks were its fish hounds. The hoodeds must be swallowing the fish before coming to the surface, I decided, so they wouldn't have to surrender their catch. For a few heady minutes, it all made sense.

But I watched for another hour that day, and I returned every few days until the ducks left in mid-March, and the more I saw and the longer I thought about it, the more I realized how little I understood. For one thing, the mergansers seldom surfaced with fish in their bills even when gulls were absent from the pond. Could they be afraid of piracy even with no pirates nearby, or were they catching something else, something smaller—some kind of freshwater crustacean or insect?

I saw four piracies in the next two weeks and each of them involved a female hooded merganser. Was that a coincidence, or were the male hoodeds somehow immune? Each of these piracies was much like the first—a duck surfaced with a fish, the gull pursued, the duck flew briefly before dropping the fish, and the gull descended to enjoy the booty.

That led me to wonder about the mechanics of the piracies. Mergansers are very swift flyers and in none of the chases I saw did it seem that the gull was gaining on the duck once she was airborne. Why didn't the duck keep flying with the fish in her bill? Did the fish's weight or its aerodynamic awkwardness make her drop it?

> One observation became a set of geometrically increasing puzzles

The pirate in each of these four events seemed by its plumage to be the same adult ring-billed gull. Could it be that this was the only gull in the area to have mastered the art of piracy? Or was it the only one who hadn't mastered the ordinary skills of scavenging? Are pirate gulls winners or losers? Is scavenging the normal way of life for gulls because piracy requires an extra dose of athleticism and intelligence that most gulls lack? Or does a gull become a pirate out of desperation—because it has failed as a scavenger? I couldn't answer any of these questions.

One day I saw a herring gull on the pond in the middle of a merganser flock. A female duck came up with a fish, the gull powered right at her, and she dove. I had been wondering why ducks hadn't tried to escape that way. Whether or not gulls can outfly mergansers, they certainly can't outswim them. Diving would also give the duck another chance to swallow her catch. But the gull splashed down right where the duck had dived and seemed to peck at the water and swallow something. Had the duck left the fish on the surface, so the gull wouldn't chase her? I couldn't tell.

This set of geometrically increasing puzzles got me thinking about the special complexities of behavior watching. Field marks are permanent, behavior is transient. If a bird is so far away that you can't see the color of its breast or the shape of its bill, you can go back to the car for your scope or hope the bird flies your way. If a duck dives under water and does or does not leave a fish on the surface for a gull that does or does not eat that fish, you may have to wait for weeks before seeing a similar event, and you will never see the exact same event.

Also, unlike field marks, behavior has transient causes and effects. Had the Mill Pond pirate gulls conditioned the ducks to give up their prey by punishing them in earlier encounters I had not witnessed? Do similar kinds of piracy occur elsewhere when hooded mergansers and gulls winter together—or is there something special about Mill Pond?

I have been browsing through my bird books trying to learn more about piracy, and my consciousness seems to have been raised so that I've been noticing more piracy out in the field. I've noticed, for example, that laughing gulls chase dowitchers when a dowitcher comes up with a big worm, but they never seem to catch them and the dowitchers always suck the worm down in flight. In the two or three dozen chases I've observed I have yet to see a laughing gull get the worm. Yet many more laughing gulls attempt this apparently unrewarding piracy than ring-bills attempt the apparently very rewarding piracy of mergansers. Are laughing gulls dumber than ring-bills? Or are they successful when I'm not looking?

As I type this up, I find it frustrating that I have to confess my inability to answer any of the above questions, but I also have to bow my head to those critics who tell birders to keep watching after the bird has been identified. Despite my frustrations, I admit that I am looking forward to the return of the ducks to Mill Pond this winter in a way I haven't before. Maybe that's the best thing about behavior-watching. The puzzles are never solved. Every story ends the same way: To Be Continued. ■

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Spotlight

IN PRAISE OF OBSCURITY

by David S. Wilcove

A little-known flycatcher slips toward extinction, along with an entire irreplaceable ecosystem

This is a story about an obscure bird and an obscure book. The bird is the Sáo Paulo tyrannulet, one of the many drab, little flycatchers that populate the forests of South America, and this article is surely the most attention it will ever receive. The book is *Birds to Watch*, a 1988 publication from the International Council for Bird Preservation, and it deserves to be read by every bird watcher.

My sole encounter with the Sáo Paulo tyrannulet came in August 1990, during a visit to Brazil's Foz do Iguaçu National Park. Southeastern Brazil harbors some magnificent birds, and Iguaçu was being mighty generous to me that morning. In one big tree laden with fruit I counted four red-breasted toucans, three saffron toucanets, and a spectacular red-ruffed fruitcrow. All of them beat a hasty retreat when four enormous toco toucans piled into the tree like a gang of playground bullies.

It was a dazzling show—gaudy, raucous, exotic—but it wasn't the only show in town. Toucans and fruitcrows rightfully draw gasps of admiration from those lucky enough to see them, but I remain a staunch fan of the duller things in life—mousey-gray antbirds skulking in the undergrowth, brown ovenbirds clinging to lianas, or brownish-gray tinamous scuttling across the forest floor—the birds that make up the "rank-and-file" of the avifauna. And no group fits this description better than the New World flycatchers. The 400-plus species run the gamut from drab to dull, their songs and calls typically amount to little more than a sequence of sneezes and hiccups, and they occur everywhere, absolutely everywhere, in South America.

And so it was with happy masochism that I set out to identify the various flycatchers that were stationed along the muddy roads and trails of Iguaçu. One flycatcher in particular caught my eye. My field notes from that morning mention a four- or five-inch birdlet pursuing insects in the understory—a greenish flycatcher with a bright yellow line curving over the eye and around the cheek, a diffuse dark spot behind the eye, two yellow bars and some yellow edging on the wings, and a yellow wash on the throat and underparts. It gave, I wrote with masterful imprecision, a "two-part squeaky call."

I was stumped. In succeeding days, I consulted the battalion of books one needs to identify Brazilian birds—Helmut Sick's *Ornitologia Brasiliera*, Dunning's *South American Birds*, Meyer de Schauensee's *A Guide to the Birds of South America*, Ridgely and Tudor's *Birds of South America*, and Narosky and Yzurieta's *Birds of Argentina and Uruguay*—and finally arrived at a verdict: *Phylloscartes paulistus*, the Sáo Paulo tyrannulet. Mystery solved, one more tick for the life list.

And there the matter might have ended, had I not become very curious about the Sáo Paulo tyrannulet. Something about that mite of a bird captured my imagination. It was so inconspicuous, so forgettable, that I actually wanted to learn everything I could about it. Even write an article about it. I consulted my books. I called an eminent neotropical ornithologist. I visited the Smithsonian Institution and the Philadelphia Academy of Natural Sciences. And what I learned was precious little.

I learned where the Sáo Paulo tyrannulet was found (southeastern Brazil, eastern Paraguay, and northeastern Argentina). I found a little painting of it in *Birds of Argentina and Uruguay.* And nothing else. No information on its foraging behavior, nesting habits, or vocalizations, no discussion of its habitat preferences, territory size, or population density. A number of ornithologists have seen the bird in the wild, and they surely have gleaned some insights into its behavior. But that information must be unpublished or buried in the literature, because as far as I can tell, to the world of science the Sáo Paulo tyrannulet is little more than a name on a checklist and a few dusty specimens locked away in a museum somewhere.

I learned one other thing about the Sáo Paulo tyrannulet in the course of my investigation: it is threatened with extinction. This I discovered by consulting *Birds to Watch,* the most authoritative listing of the imperiled birds of the world. With punishing understatement, the authors note that the tyrannulet is "insufficiently known" and "seems to be restricted to a few areas" in a region undergoing massive deforestation.

In neither respect, unfortunately, is the Sáo Paulo tyrannulet unique. *Birds to Watch* lists over 1,000 species of birds that are thought to be threatened with extinction—an astonishing 11 percent of the world's avifauna. All the familiar names that grab our attention are included—the California condors, whooping cranes, and ivory-billed woodpeckers of this world. But what depresses me most about *Birds to Watch* is the number of obscure and little-known birds that populate its pages, species like the Sumatran scops owl, Salvadori's nightjar, Dja River warbler, Brass's friarbird, olive-headed brush-finch, and Lake Lufira weaver. What do we know about these birds? Who is trying to save them? Will we even know when they're gone? Page after page, phrases such as "little known," "unrecorded in recent years," "known only from a few localities," or "presumed extinct yet perhaps survives" are tacked onto the accounts of the various birds. The inescapable conclusion one draws is that we may soon eliminate a significant portion of the world's birds without knowing anything about them.

As depressing as this may be, bird watchers are fortunate in one respect: At least they will know what has been lost. Although one or two newly discovered species of birds are described each year, we probably know of the existence of over 99 percent of the living birds of the world. No other group of organisms is as well known. Indeed, when it comes to other plants and animals, only a small fraction of the species has been cataloged. Remarkably, we do not know the total number of species of all kinds on earth to the nearest order of magnitude. Thus far, about 1.4 million species of plants, animals, fungi, and bacteria have been discovered and described; the actual number may be 5 to 30 million.

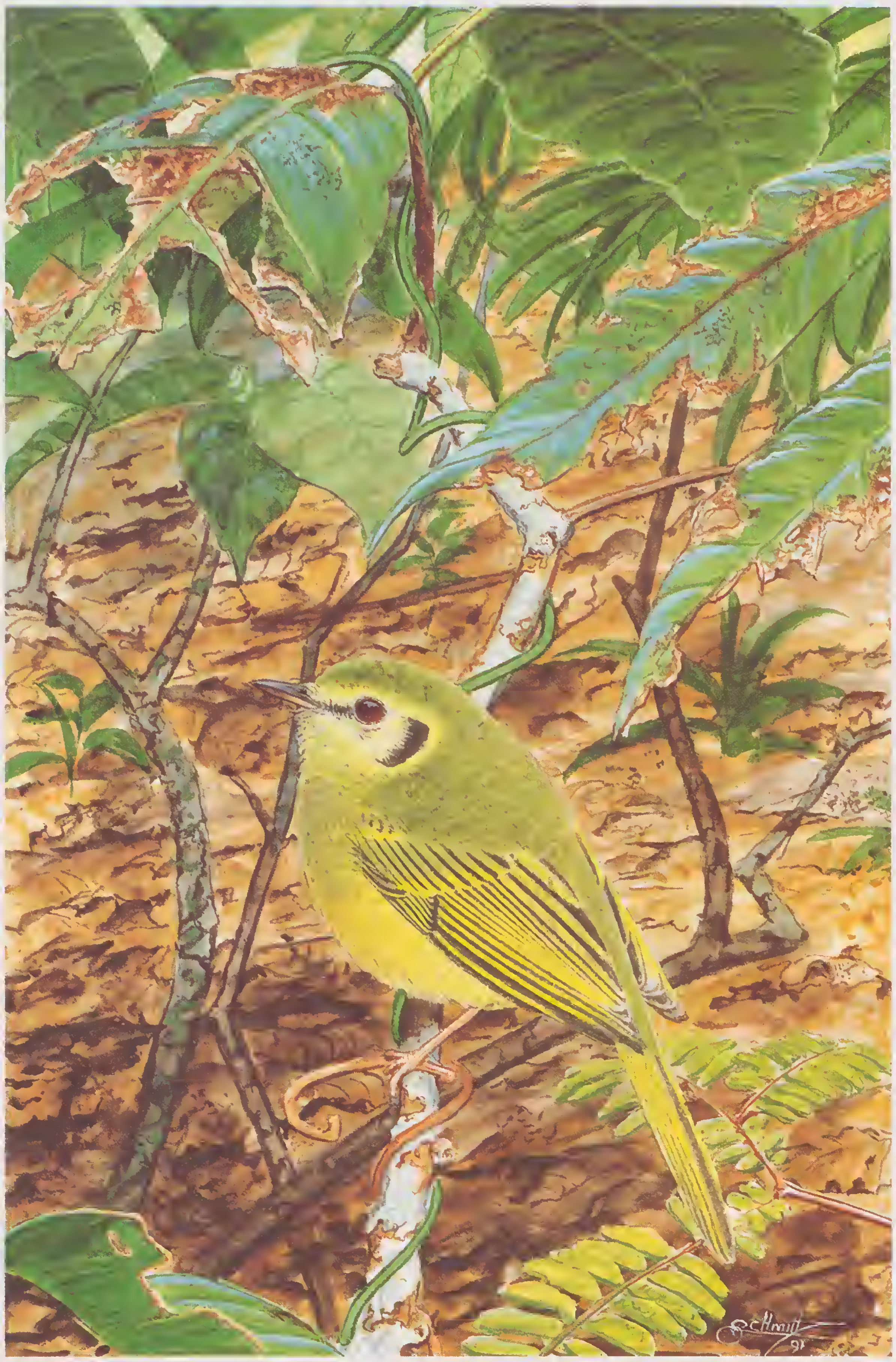

ILLUSTRATION BY JOHN SCHMITT

Our ignorance, however, has not stopped us from eliminating species at breakneck speed. The Sáo Paulo tyrannulet is endangered because it is restricted to the forests along the Atlantic coast of Brazil, its range barely extending into northern Argentina and eastern Paraguay. Long isolated from the forests of the Amazon basin by vast stretches of intervening drier lands, the Atlantic coast forests have developed a flora and fauna rich in endemic species. For example, of the 2,124 species of butterflies that occur in the Atlantic coast forests, over 900 occur nowhere else. Today, 95 percent or more of the Atlantic coast forests have been destroyed. As urban and agricultural development gobbles up these remarkable forests, the unique species within them are vanishing. The Sáo Paulo tyrannulet is just one example. And for every little flycatcher that vanishes, an unknown but vastly larger number of orchids, butterflies, nematodes, fishes, reptiles, and fungi will disappear too.

Nor is this a problem unique to Brazil. Change "Sáo Paulo tyrannulet" to "gray-crowned greenbul" and substitute "Madagascar" for "Brazil"; the story is still that of an obscure bird whose demise signals the destruction of an irreplaceable ecosystem. Or, lest we become too complacent in this country, try "red-cockaded woodpecker" and "longleaf pine forests of the southeastern United States." The locations and species may change, but the same events are happening everywhere. By its very obscurity, the Sáo Paulo tyrannulet is a reminder of how rich, little known, and fragile is the diversity of life on this crowded planet. ■

David Wilcove is an ecologist with the Environmental Defense Fund in Washington, D.C. He also serves on the board of directors of the U.S. and Pan-American sections of the International Council for Bird Preservation.

You can order a copy of Birds to Watch: The ICBP World Checklist of Threatened Birds *through the Smithsonian Institution Press, Washington, D.C. 20560 or the International Council for Bird Preservation, 32 Cambridge Road, Girton, Cambridge CB3 0PJ, United Kingdom.*

THE ART OF MISIDENTIFICATION

by Pete Dunne

I have a wall full of books, mostly field guides. Field guides to places that even Rand McNally has never heard of. Field guides to every avian conglomerate conjured up by science. First, second, and third editions of field guides to birds I've never even dreamed of seeing.

But among all these guides, there is not one that deals with one of birding's most common problems. There is not one book dealing with the art of *mis*identification—the ability to blow an identification and then bamboozle your way clear.

Sure. Anyone can misidentify a bird—and most people do. But blowing enough smoke to cover your boo-boo or convincing the gallery that you really saw a Cooper's hawk while everyone else was busy looking at a sharp-shinned hawk takes real talent. It takes a misidentification expert.

How can you tell a misidentification expert when you see one? It's easy. Misidentification experts have loud voices, and in the midst of a group of novice birders they are invariably the first to shout out a bird name.

Ah, but get a bunch of misidentification experts together, drop an immature jaeger in their midst and all you'll hear is:

"Ah ha!"

"Ummmmm. Nice."

"Good one!"

"First one of *those* today."

Note! Nobody actually identifies the bird. Why? Because they're experts. Experts don't have to identify birds. Experts know what birds are. And if you never actually put a name to a bird, then you can never be proven wrong (which to a misidentification expert is much more important than ever being right).

So the first trick in the art of misidentification is to establish yourself as an expert. You can accomplish this by purchasing roof prism binoculars and writing long, rambling rebuttals to articles on the use of wing formulas to separate the races of *M. georgiana.*

Incidentally, this is another thing that distinguishes identification experts from misidentification experts. Identification experts initiate; misidentification experts snipe from the outside.

Waay up thaaahr . . . disappeared in the haze.

Here's another. Real experts make identification errors because they are always trying to become better than they already are. Misidentification experts never make mistakes, because they are already better than anyone else could ever hope to be.

Misidentification experts are incredibly skilled at finding birds that sit on branches for about as long as the green flash sits on the horizon.

"Anyone *else* get a good look at that bird? No? Oh, too bad. *Beautiful* Lawrence's warbler."

Misidentification experts are amazingly adept at finding birds flying at altitudes that are barely suborbital.

"Aaaaah . . . waaaay up thaaahr . . . No reference. Can't drop my binoculars or else . . . ahhh . . . ah. Disappeared in the haze. Peregrine for sure."

And misidentification experts are unsurpassed at identifying birds going dead away, into the sun, just below the horizon.

"Skua!"

If the bird doubles back, a veteran misidentification expert will have "dropped the bird." If it lands in the chum slick and seems, at least to the novices present, to be indistinguishable from a first-winter herring gull, then "It's not the bird I had."

In the event of an argument, misidentification experts will have had a "better angle" than you did, can claim "*extensive* experience with the species," and will be able to draw upon new field marks gleaned from the paper they are reviewing on "Tubenoses of the Ogallala Aquifer" (or something like that). And . . .

"By the way, did you know that your new $1,300 binoculars have a serious chromatic aberration? Too bad."

Misidentification experts are not born. Becoming one is a long, hard process—in many respects, a more difficult process than just learning how to identify birds correctly in the first place.

Misidentification experts are not that uncommon, so it astonishes me that no one has written a field guide to the misidentification of North American birds. Just consider. There is only one correct identification for each species, but almost an infinite number of misidentifications. Think of all the possibilities. Think of all the sequels. Come to think of it, I might write one myself. Then wait for all the rebuttals to come in. ■

ILLUSTRATION BY JEFF SIPPLE

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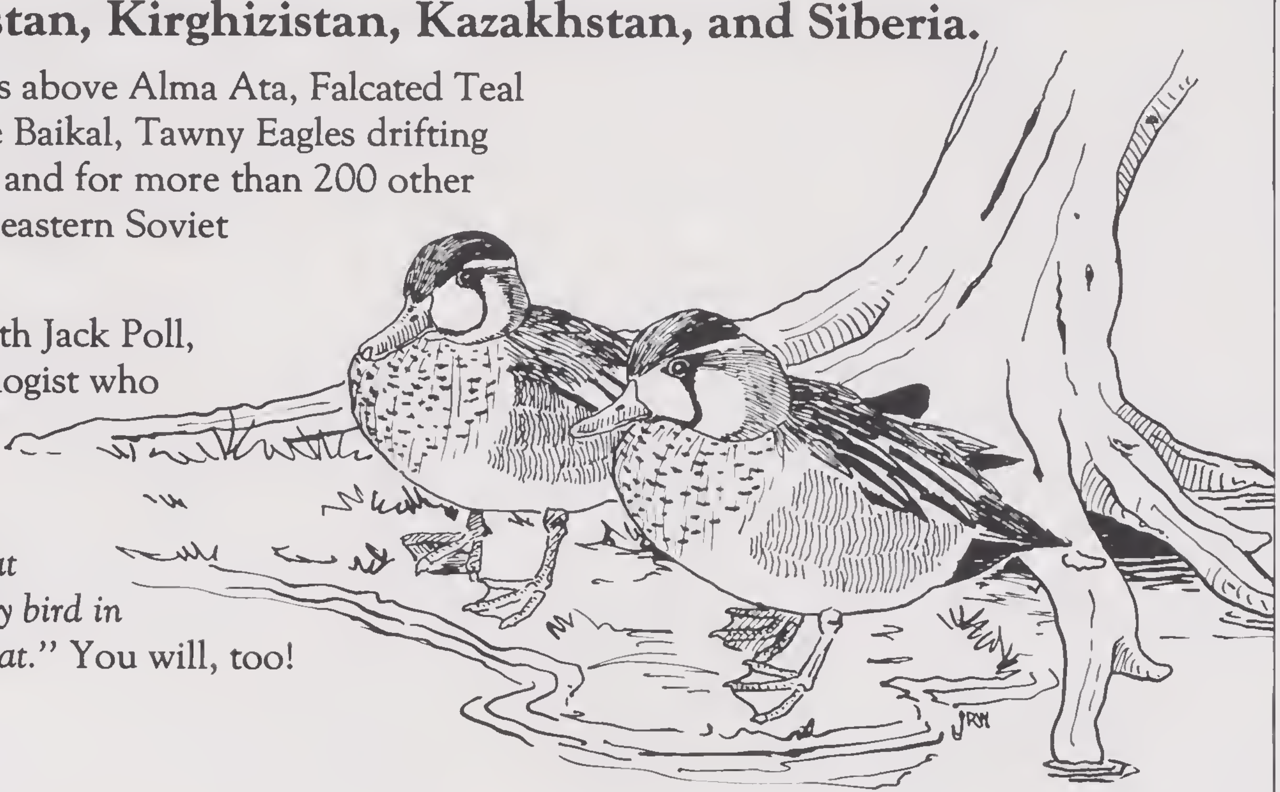

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BIRDSCOPE

The research newsletter of the Cornell Laboratory of Ornithology ■ Volume 6, Number 1 ■ Winter 1992

BRP's Elephant Project: Expedition to Zimbabwe

Bill Langbauer

I was flying over the plains of Zimbabwe with ecologist and audacious bush pilot Debbie Gibson, looking for Jabula, a female elephant sporting a collar with one of our radio transmitters. We found the signal and headed toward it, flying over a large group of bull elephants. We saw family groups of females and their young to the right and left—but no Jabula. Debbie went into a power dive and headed back the way we'd come. We saw the same scene—family groups, bulls, no Jabula. Where could she be? Debbie swept us over the plain again and again, turning the plane more violently each time, until I could feel my face turning green. Finally we had the sense to fly lower and examine the group of bulls. There in the midst of all those masculine backs was a single dull orange collar—Jabula.

Whereas we found Jabula through a combination of technology and logic, how the bull elephants found her is something of a mystery—for humans, anyway. Mature bulls may live miles apart from the groups of females, and female elephants enjoy an absurdly short period of sexual receptivity, about four days every four years. How do males find receptive females? Undoubtedly their sense of smell is a factor, but this won't work in all conditions. Something else must be going on.

Researcher Rowan Martin noted another elephant mystery about a decade ago. Tracking radio-collared elephant groups in Zimbabwe, he observed that groups often moved in a coordinated way even though they were separated by several miles, and even though wind conditions prevented them from smelling each other. Charting the groups' movements over time on a computer screen, he got the impression of an elephant-scale ballet, with groups moving in parallel lines, turning in unison, then circling back—sometimes maintaining this synchrony for several days—while staying 1/2 to 2 miles apart the entire time.

Since 1984 Katy Payne and I, and more recently Russ Charif, have been investigating these mysteries of elephant behavior as part of the Lab's Bioacoustics Research Program (BRP). Why Bioacoustics? The common thread in the two examples above is that they involve the ability to communicate over long distances. We believe the solution to the puzzling behaviors lies in sounds: the infrasonic calls of elephants. These long-wavelength, low-frequency sounds travel much farther than short wavelength, high-frequency sounds of the same strength. BRP provides an excellent base from which to study them.

Working to confirm our suspicions that elephants communicate with calls that are largely inaudible to humans has been a delightful task, one that has taken us to major zoos in the United States and Canada and to exotic locations in eastern and southern Africa. Our group has been involved in every elephant infrasound research effort to date, from Katy's initial work at the Washington Park Zoo to my sound playback experiments with free-ranging African elephants. We have found that both Asian and African elephants make infrasonic calls, and that African elephants can perceive these calls over distances of at least 2 miles.

In 1990, I led a 5-month expedition to Zimbabwe to radio-collar some of the same elephants that Rowan Martin had collared years earlier when he made his observations on coordinated movement. This time, however, we planned to listen in on what the elephants were saying while they were moving, using equipment and software we had developed at BRP. We worked with Martin and about 30 native Zimbabweans at the Sengwa Research Area, an idyllic spot 90 miles from the nearest town. The Zimbabwean

BILL LANGBAUER

Groups of elephants coordinate their movements long-distance. BRP's Elephant Project reveals how they do it.

team provided expertise in tracking, both by radio telemetry and on foot. We provided the monitoring instruments, including collars with elephant voice-activated walkie-talkies, radio receivers, and computers that automatically recorded all the strong, low-frequency calls made by the collared elephants.

We radio-collared 16 elephants in 13 different family groups, then simultaneously monitored their vocalizations and locations around the clock for three solid months. In conjunction with our communication study, Rob Ramey II, a graduate student at Cornell, collected tiny skin samples from the collared elephants for DNA fingerprinting. We hoped this biochemical analysis of the animals' genetic material would let us determine whether the elephant groups that coordinated their movements were more closely related to each other than they were to other groups.

Everyone helped with the many jobs the project entailed. My wife, Lillie Wilson, our field assistant, Loki Osborn, and the Zimbabwean game scouts usually did the location tracking, using movable radio antennas to take bearings on all the collared elephants every three hours, day and night, for a total of nearly 10,000 locations over the three months. Steve Powell, a rocket scientist from the Cornell Space Sciences Program, helped me to design much of the monitoring equipment and made sure that it was set up correctly in the field. Russ and I tended all the computers and other electronics that received the transmissions from the elephants' collars. We recorded almost 80,000 transmissions, about 1,000 of which were strong elephant calls. (The others were wind noise and the sounds made by behaviors such as running and mud-bathing.)

Russ and I developed specialized software that allowed us to plot the elephants' locations on the computer screen as soon as Lillie and the scouts gave us the data. Then, knowing where the elephants were, Rob, Laura Brown (a graduate student in Ecology and Systematics at Cornell), and a game scout took off on foot to intercept the elephants and collect skin samples for DNA fingerprinting. They used biopsy darts designed to take a small plug of skin, then bounce off. Elephants are thick-skinned, and they often didn't even notice that the sample had been taken.

Meanwhile Katy coordinated the efforts to record the behavior of the collared elephants. We hoped to use this information to match calls to specific behaviors or circumstances. It was a difficult job. Zimbabwean elephants are wary of people and run away at the slightest whiff of human scent. Sometimes Katy watched distant elephants from a mesa in the middle of the park, other times she tracked them carefully on foot with the help of a Zimbabwean game scout. In this way we amassed several hours of videotape on the actions of our collared animals.

We are now hard at work identifying periods of coordinated movement, categorizing calls, and correlating calls and movement. It is a daunting task, considering the amount of data we brought back, and one that would have been impossible a few years ago. It is an exhilarating feeling to be working in a field where your capabilities multiply each month, and at a place where many of the innovations that make this possible are being developed. For example, the same computer techniques developed by Chris Clark and Steve Mitchell in BRP to help an ornithologist identify bird species by their calls may help us to categorize our elephant calls.

By the way, remember Jabula, the female elephant in the midst of all the bulls? Our computer analysis has shown that when Debbie and I were flying overhead she was making estrus calls—calls made only by sexually receptive female elephants and strong enough to be heard miles away by bulls. Isn't science wonderful?

Sapsucker Woods Beetle Studied for Biological Control Plan

Waterfowl may benefit from biological control agent

An ordinary-looking beetle that's known almost exclusively from a population in Sapsucker Woods may help scientists learn how to control an invasive wetland plant. Purple loosestrife, imported from Europe in the early 1880s, has invaded over 400,000 acres in the northern United States and Canada. The plant poses a particular threat to waterfowl because it crowds out the native vegetation they eat.

TIM GALLAGHER

The Sapsucker Woods Gallerucella *species.*

Although few North American animals eat loosestrife, two species of European beetles love it. Scientists at the U.S. Department of Agriculture, Department of the Interior, and Cornell University hope to import these beetles and release them as biological control agents. But first they want to know which parasites and predators are likely to, in turn, attack the imported beetles.

To get this information, scientists are studying a related species of beetle that's native to the United States. Cornell entomology professor Maurice J. Tauber and his collaborators—James Nechols of Kansas State University, John Obrycki of Iowa State University, and Catherine Tauber, also at Cornell—investigated a beetle in the same genus as the European beetles that lives in Sapsucker Woods and almost nowhere else. This dull black beetle does eat purple loosestrife, but not as avidly as its European cousins. Any predators, parasites, or pathogens that attack the Sapsucker Woods beetle, however, might limit the effectiveness of the introduced beetles, too.

If you visited the Lab last summer, you may have noticed the beetle enclosures that Tauber and his associates set up near a Sapsucker Woods boardwalk. The enclosures—gauzy, white, hanging cylinders—were sealed around stalks of loosestrife and the beetles living on them. Some enclosures kept predators and parasites out, while others had openings through which the natural enemies could enter.

The researchers are now analyzing the data from the summer, comparing the fate of beetles in the open and closed cages. As for the project as a whole, the researchers hope that the European beetles will be released in the United States within a year.

AROUND THE LAB

TIM GALLAGHER

Greg Butcher spoke on nesting red-wings at AOU.

MEETINGS ATTENDED

The Lab was well represented at the annual meeting of the American Ornithologists' Union, held August 14-17, 1991, in Montreal. **Gregory S. Butcher** spoke on "Nesting success of red-winged blackbirds in agricultural habitat"; Butcher's coauthors were Lab staffers **Pixie Senesac, Jim Lowe,** and **Diane Tessaglia.** A talk on "Predation at bird feeders in winter," by **Erica H. Dunn** and **Diane Tessaglia** was presented by Tessaglia. And **Charles R. Smith** spoke about his work with Steve DeGloria of the Cornell Laboratory for Environmental Applications of Remote Sensing on a "Procedure for assessing relationships of birds to land use and land cover using remotely sensed satellite imagery." Meanwhile, **Greg Budney** and **Bob Grotke** of the Library of Natural Sounds (LNS) manned a table in the exhibit hall, where they gave a demonstration of tape recorder meters, fielded questions about recording techniques, and aired a video about the new LNS facility.

Gregory S. Butcher, director of Bird Population Studies, was appointed chairman of the monitoring working group of "Partners in Flight—Las Aves de las Americas" at its first major meeting, held September 4 and 5, 1991, in Washington, D.C. Partners in Flight is another name for the Neotropical Migratory Bird Conservation Program, hailed by ornithologists as a significant initiative for the protection of neotropical migrants. The program is a joint effort of several government and nongovernment agencies, including the U.S. Forest Service, U.S. Fish and Wildlife Service (USFWS), National Park Service, Bureau of Land Management, Cornell Lab of Ornithology, Manomet Bird Observatory, and National Audubon Society. Butcher's working group is assessing monitoring needs and plans to produce a manual for federal landowning agencies this spring.

Richard E. Bonney, Jr., director of Education and Information Services, is also involved in the Neotropical Bird Conservation Program. He has been appointed co-chairman of the education and information working group of "Partners in Flight" and attended a Washington, D.C., meeting in October, at which the group developed a work plan for the coming year. In a lighter vein, Bonney served as a judge at the 1991 North American Shorebird Carving Championship, held September 21 in Stone Harbor, New Jersey. The event was part of the annual Wings 'n Water Festival sponsored by The Wetlands Institute, a nonprofit organization specializing in ecological research and education on the southern New Jersey coast.

Christopher W. Clark, director of the Bioacoustics Research Program, traveled to Denmark in May 1991, to conduct a pilot study on the use of microphone arrays to record communication among great tits and European blackbirds. Clark's collaborators in this effort are Torben Dabelstten of the University of Copenhagen and Peter McGregor of Nottingham University. Clark also attended the International Symposium on Sensory Systems and Behavior of Aquatic Mammals, held October 15-20, 1991, at the USSR Academy of Sciences in Moscow. At the symposium, Clark spoke on "Evidence for low frequency acoustic communication and navigation in mysticete whales."

Charles R. Smith attended the joint meeting of the Cooper and Wilson Ornithological Societies, held in Norman, Oklahoma, in May 1991. Smith was an invited speaker for the meeting's special symposium on endangered species conservation; his talk was titled "Integrating distribution and abundance information to assess conservation needs for songbirds." Smith also gave the keynote address at a September 17 conference titled "Networking for Biodiversity." The conference, held in Watkins Glen, New York, was sponsored by the Natural History Network of the Cayuga Lake Basin.

Katy Payne of the Bioacoustics Research Program was an invited speaker at the Cambridge University Department of Zoology, Cambridge, England, in May 1991.

Stephen Kress, a Lab associate, spoke at the Northeast Wildlife Conference in May 1991 on "A strategy for restoring common, Arctic, and roseate terns to historic nesting habitat in the Gulf of Maine."

COURSES TAUGHT

The Bioacoustics Research Program continues to strengthen its ties to the academic community. **Christopher Clark** launched a new course in the Division of Biological Sciences at Cornell University in autumn 1991. Titled "Sound transmission in terrestrial habitats," the graduate seminar enrolled eight students who conducted experiments on the effects of habitat on bird sound transmission.

HONORS AND AWARDS

Charles R. Smith is president-elect of the New York chapter of The Wildlife Society, an international organization of professional wildlife biologists.

OCEAN VOICES OF THE ALASKAN ARCTIC
OCEAN VOICES OF THE ALASKAN ARCTIC
CLO

CINDY PAGE

SPECIAL PROJECTS

"Sounds of the Alaskan Arctic Ocean" is the latest cassette production from LNS and BRP. The tape, produced for the State of Alaska, North Slope Borough, presents marine mammal sounds collected by BRP director **Christopher Clark** and associates as part of the ongoing Alaskan Bowhead Whale Census.

The BBC's eight-part television series on wildlife in America, "Land of the Eagle," which aired on PBS this past November, featured many sounds specially recorded for the project by LNS curator **Gregory Budney** and Lab associate Geoff Keller. The two collaborated with BBC sound recordists Nigel Tucker and David Toombs to gather some never-before-recorded sounds, including the crunch of an eagle chick eating fish bones.

The always-popular LNS Sound Recording Workshop attracted 13 students for the summer 1991 session in California's Sierra Nevada mountains. One particularly dedicated student returned for the third time. And a record number of graduate students participated, suggesting the growing importance of sound recording as a research tool.

NEW STAFF

The Lab welcomes a new administrative manager, **Carol Pyhtila**. Before joining the Lab, Ms. Pyhtila was senior administrator for Cornell's Division of Nutritional Sciences. Former Lab administrative manager Diane Johnson is pursuing graduate study at Cornell—we wish her well in her new endeavors.

Recent Publications

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Lab staff in bold type.

Researcher **Russell Charif** has officially joined the Elephant Project after serving as a consultant for several years. Charif, who holds a master's degree in neurobiology and behavior from Cornell, will have primary responsibility for analyzing data from the project's 1990 Zimbabwe expedition.

GRANTS RECEIVED

In May 1991, **Bird Population Studies** received a $30,000 grant from the USFWS Office of Migratory Bird Management. Under the terms of the grant, BPS researcher **Rob Marshall** will summarize information on the breeding birds of northeastern forests, using the Breeding Bird Census (BBC) database that the Lab maintains. Specifically, Marshall will determine where various forest bird species now breed, and also how the distribution of breeding sites has changed over time (BBC data on breeding birds extends back to 1937). USFWS will use the project results to determine habitat needs for those migratory bird species that breed in the forests of the northeastern United States.

The Elephant Project, a part of the Bioacoustics Research Program, received grants from the National Science Foundation, World Wildlife Fund, and the National Geographic Society in 1991. The funding is being used to analyze elephant vocalization data collected during a 1990 field expedition in Zimbabwe.

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LIVING BIRD

For the Study and Conservation of Birds

SPRING 1992

Laboratory of Ornithology
159 Sapsucker Woods Road
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Ithaca, New York 14850

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For the Study and Conservation of Birds

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For more information, please call or write: Nora Ettinger, Tour Coordinator, 159 Sapsucker Woods Road, Ithaca, New York 14850. (607) 254-2423

Jon Reis Photography

MAR 2 5 1992

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LIVING BIRD

SPRING 1992 VOLUME 11 NUMBER 2

Laboratory of Ornithology
159 Sapsucker Woods Road
Cornell University
Ithaca New York 14850

Greetings from Sapsucker Woods

One of the best fringe benefits of working at the Lab is the view from my office window. No matter the time of year, interesting sights abound: colorful songbirds, ever-present ducks and geese, as well as occasional rarities. But had I looked at the same area just 35 years earlier when the Lab was built, I'd have seen only an empty field stretching from where the Lab now stands all the way north to Route 13—no pond, no woods, and probably few birds.

While searching through the Lab archives for a photograph to run with this issue's profile on Sally Spofford (who was here at the birth of the Sapsucker Woods facility), I came across some remarkable pictures of the Lab grounds during construction: workers digging the pond; staffers laying out trails in areas that didn't even have trees at the time.

The Lab facility and grounds are an example of how an area can be developed in an environmentally positive way. Instead of destroying an ecosystem, the Lab of Ornithology improved the surrounding area for wildlife by expanding the existing woodlands and adding a 10-acre pond. Sapsucker Woods is now a safe haven for any songbirds, waterfowl, deer, and other wildlife that pass through.

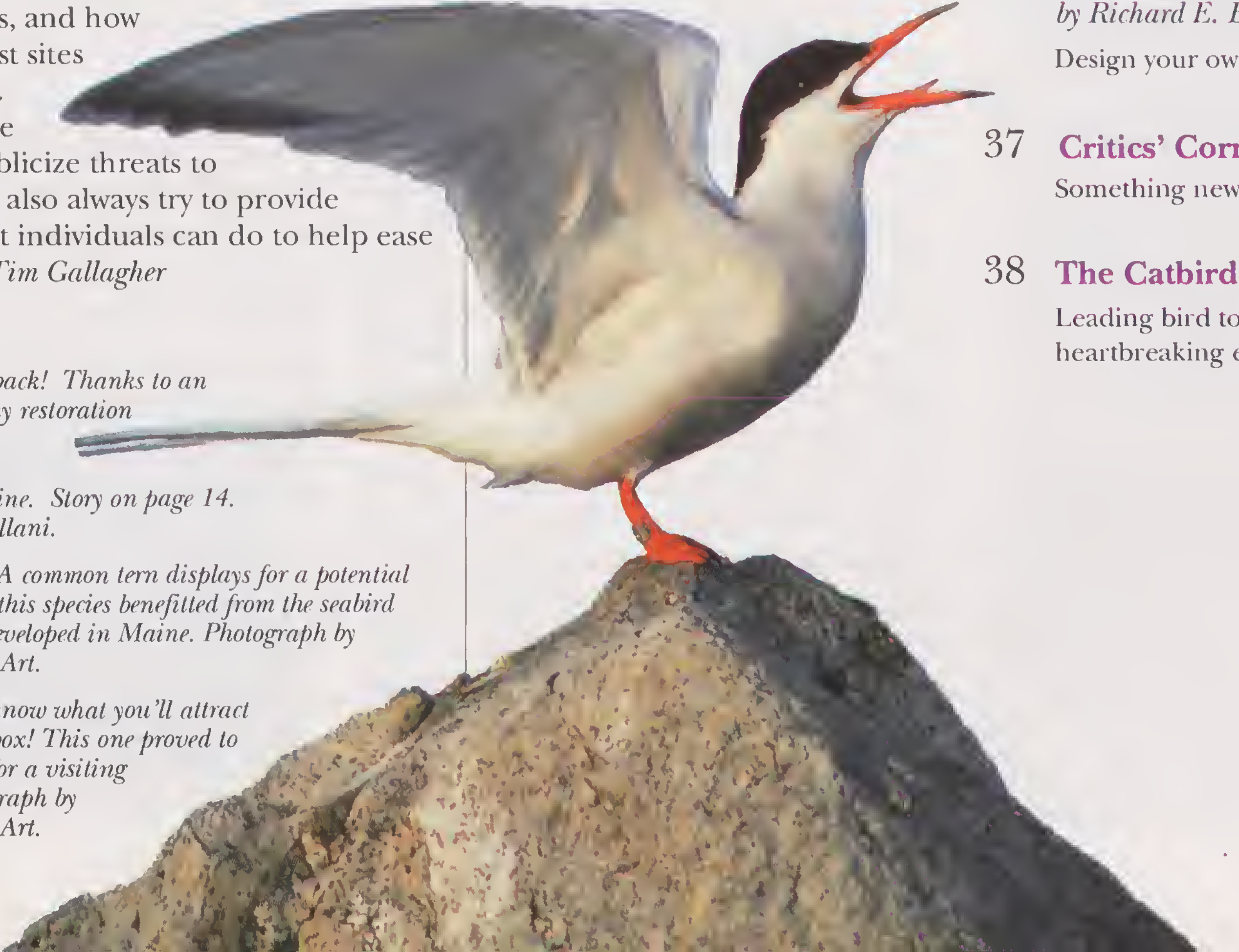
We need more positive examples to follow. The newspapers are full of doom and gloom articles about the Earth's future. But the articles rarely offer potential solutions. In this issue we look at a successful program for reestablishing seabird colonies, research to improve placement of wood duck boxes, and how you can provide nest sites for your local birds.

At *Living Bird* we will continue to publicize threats to birdlife, but we will also always try to provide suggestions on what individuals can do to help ease a bad situation. —*Tim Gallagher*

***Cover:** The puffins are back! Thanks to an innovative seabird colony restoration project, colorful Atlantic puffins once again nest in Muscongus Bay, Maine. Story on page 14. Photograph by Robert Villani.*

***Right:** "Kee-ar-r-r-r" — A common tern displays for a potential mate. Like the puffins, this species benefitted from the seabird restoration techniques developed in Maine. Photograph by Arthur Morris/Birds as Art.*

***Back cover:** You never know what you'll attract when you set up a bird box! This one proved to be an irresistable perch for a visiting peregrine falcon. Photograph by Arthur Morris/Birds as Art.*



Features

8 **Global Warming: An Imminent Threat to Birds?**
by Elliot J. Tramer
Many bird species will be unable to cope with the rapid climate and habitat changes predicted by scientists.

14 **From Puffins to Petrels**
by Stephen W. Kress
Efforts to restore puffin colonies off the Maine coast provide valuable lessons for endangered seabird restoration projects.

22 **A Basic Box for a Basic Need**
by Scott Shalaway
One simple blueprint offers easy-to-build housing for a wide variety of America's most popular cavity-nesting birds.

26 **Killing Them with Kindness**
by Paul W. Sherman and Brad Semel
Beware of good intentions! Incorrectly placed nest boxes can actually reduce the breeding success of wood duck pairs.

Departments

4 **Letters**

5 **BirdNews**

Columns

33 **Profile** *by Cynthia Berger*
Ornithologist Sally Spofford holds a major place in the Lab's history.

35 **Beyond the Field Guide**
by Richard E. Bonney, Jr.
Design your own research project.

37 **Critics' Corner**
Something new in bird song cassettes.

38 **The Catbird Seat** *by Pete Dunne*
Leading bird tours can be a heartbreaking experience.

LIVING BIRD

SPRING 1992 VOLUME 11 NUMBER 2

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Letters

My Favorite Condor

What a wonderful article by Mel White ("The Condor Passes," Autumn 1991). My All-Time Favorite Sighting also involves condors, three seen on a fishing/climbing trip to the Andes with my oldest son in 1987.

We had selected Volcano Lanin for our climb. The 12,500-foot peak dominates the area and is snow covered above 8,000 feet. Our afternoon climb to the hut led up a steep, rocky ridge of slab and dust.

Suddenly we were in the center of a swirl of birds—three Andean condors circling us at close range as we trudged upwards. It was a once-in-a-lifetime chance to observe these great birds, sometimes as close as 40 yards, for about 20 minutes. What a sight and what a feeling—the condors wheeling around us as we viewed the surrounding Andes from on high—a great bonding experience for father and son.

We went on to the top of Lanin the following morning, and we saw more condors at a distance. But the ridge climb was our all-time favorite condor sighting.

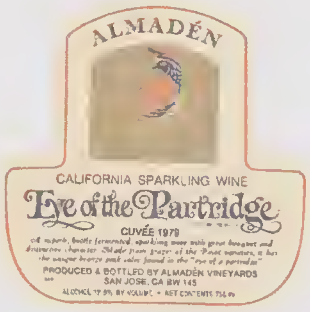
Bill Phillips
Old Saybrook, Connecticut

Of Birds and Bottles

Anent "Birding by the Bottle," by Peter Stangel (Autumn 1991): Not long ago I asked friends to send me empty liquor bottles having birds or bird names on the labels. I filled some with tea (for color), then photographed them for a Christmas card, captioned "Alcoholic Birder's Post-Field Trip Indoor Guide, Plate I." It was a good card.

Yet I now regard the omission of Old Crow as inexcusable. Someone once asked a liquor dealer for "Old Squirrel" and was told that they did not stock it, but had Old Crow. The customer's retort: "I don't want to flap my wings; I just want to hop around a bit."

Ralph S. Palmer
Tenants Harbor, Maine


ALMADÉN
CALIFORNIA SPARKLING WINE
Eye of the Partridge
CUVÉE 1979
PRODUCED & BOTTLED BY ALMADÉN VINEYARDS
SAN JOSE, CA BW 145

Partridge or quail, here's another for Peter Stangel's collection. I suspect Almaden no longer makes the stuff, which is no doubt fortunate—pretty label, though!

Wright Montgomery
Fairfield, Connecticut

A vineyard on Pelee Island in Ontario (very close to Point Pelee National Park) features the famous Point Pelee Birding Festival on its labels. I enclose a label off one of their better wines (my preference).

Kathleen Burtch
Mallorytown, Ontario

HMANA Says "Thanks!"

Congratulations to Rick Bonney on his fine column, "Beyond the Field Guide." His excellent article, "Good Hawking" (Summer 1991), gave the Hawk Migration Association of North America a big boost—I would have written sooner to thank you had I not been so busy answering letters from your readers!

Myriam Moore
Secretary, HMANA
Lynchburg, Virginia

We welcome letters from readers.
Address letters to: The Editors,
Living Bird, 159 Sapsucker Woods
Road, Ithaca, New York 14850.

BirdNews

CALIFORNIA CONDORS RELEASED

On January 14, two young California condors became the first of their species in almost five years to fly free. (See "Aloft Again" in the Autumn 1991 issue of *Living Bird*). The birds had been placed in a net-covered cliffside enclosure in the Sespe Condor Refuge last October, along with two young Andean condors, to acclimate them to the area. The actual "release" consisted of removing the netting. So far the birds have made only short flights in the vicinity of the release site, but they should soon be soaring high above the hills of Southern California.

THE FAT MACHINE

This western sandpiper (below) is not undergoing some bizarre form of avian torture. Quite the contrary; the bird is being painlessly evaluated for total body fat in a Small Animal Body Composition Analyzer (affectionately nicknamed "the Fat Machine"). The sandpiper will be released unharmed.

The $6,500 machine is similar to the magnetic resonancing machines used in hospitals. Before the instrument was widely available, body fat analyses required birds to be sacrificed.

Why measure birds' body fat? Ornithologists who study migratory shorebirds make good use of the Fat Machine; body fat measurements serve as an index of a migrant's physiological condition and, indirectly, of the quality of winter feeding grounds.

JOHN SIDLE

"Send for the mounties!"

THE PARROT GETS A NAME

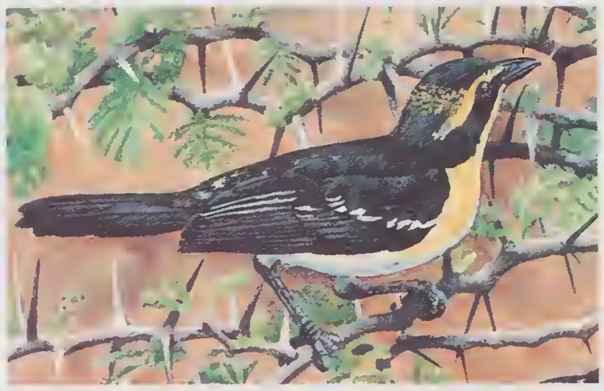
John P. O'Neill, on his 1987 expedition to Peru, collected specimens of an unusual bird—a species unknown to science. The events leading up to that discovery are grippingly chronicled in Don Stap's recent book, *A Parrot Without a Name*, which was reviewed in the Summer 1991 issue of *Living Bird*.

O'Neill's find, a small green parrot with a powder-blue forehead, is nameless no longer. Officially, it is *Nannopsittaca dachilleae*, a species of parrotlet. O'Neill and ornithologists Charles A. Munn and Irma Franke J. published the description of the locally abundant species in the April 1991 issue of *The Auk*. The species name, *dachilleae*, commemorates Barbara D'Achille, a South American conservationist who wrote for Peru's leading newspaper and newsmagazine. D'Achille was killed by Peruvian terrorists in 1989.

NEW SPECIES CONFIRMED BY DNA ANALYSIS

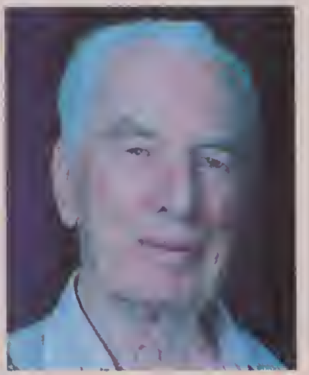
When a scientist discovers a new species, the standard procedure is to collect a "type specimen" and preserve it for reference purposes. Recently, taxonomists recognized the first new species ever to be confirmed without sacrificing a specimen: the Bulo Burti boubou (*Laniarus liberatus*) was classified on the basis of DNA analysis.

Entomologist and avid bird watcher Eddie Smith spotted the singular shrike on the grounds of a hospital in Somalia in August 1988. Reluctant to kill a member of a species that might be near extinction, Smith arranged for the bird to be captured and placed under the care of a West German ornithologist living in Somalia. DNA analyses comparing the boubou's genetic makeup to those of other species showed that it was, indeed, a brand-new species. The work is described in a recent article by Edmund F. G. Smith, Peter Arctander, Jon Fjeldså, and Osman Gedow Amir, published in the journal *Ibis* (vol. 133:227-235;1991). In 1990 the bird was released; although the hospital grounds were inaccessible because of civil war, a patch of apparently suitable habitat was found in a protected riverside woodland. The Bulo Burti boubou's Latin name, *liberatus*, emphasizes the unique way in which it was identified—from a bird that was later set free.


New bird: the Bulo Burti boubou

Bulo Burti boubou by Jon Fjeldså, reprinted from the journal *Ibis* courtesy of the artist and Blackwell Scientific Publications, Ltd.

GREENEWALT IS ALLEN AWARD WINNER


C.O. Wilson

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Global Warming: An Imminent Threat to Birds?

by Elliot J. Tramer

Predicted climate changes may devastate plant communities and the birds that depend on them

The sun climbed above the treetops, quickly dissipating a curtain of fog. It was late April in the year 2050. An elderly bird watcher scanned the glade, as he had every spring for nearly 60 years. The forest had changed strikingly in his lifetime, even though the tract had been undisturbed by logging or other human activities. As the climate had grown steadily warmer and drier, most of the beeches, maples, ashes, and elms had died. Many of the oaks survived, but the tall, closed-canopy forest of his youth had been replaced by one in which clumps of trees were interspersed with grassy openings and thickets of sumac and briars.

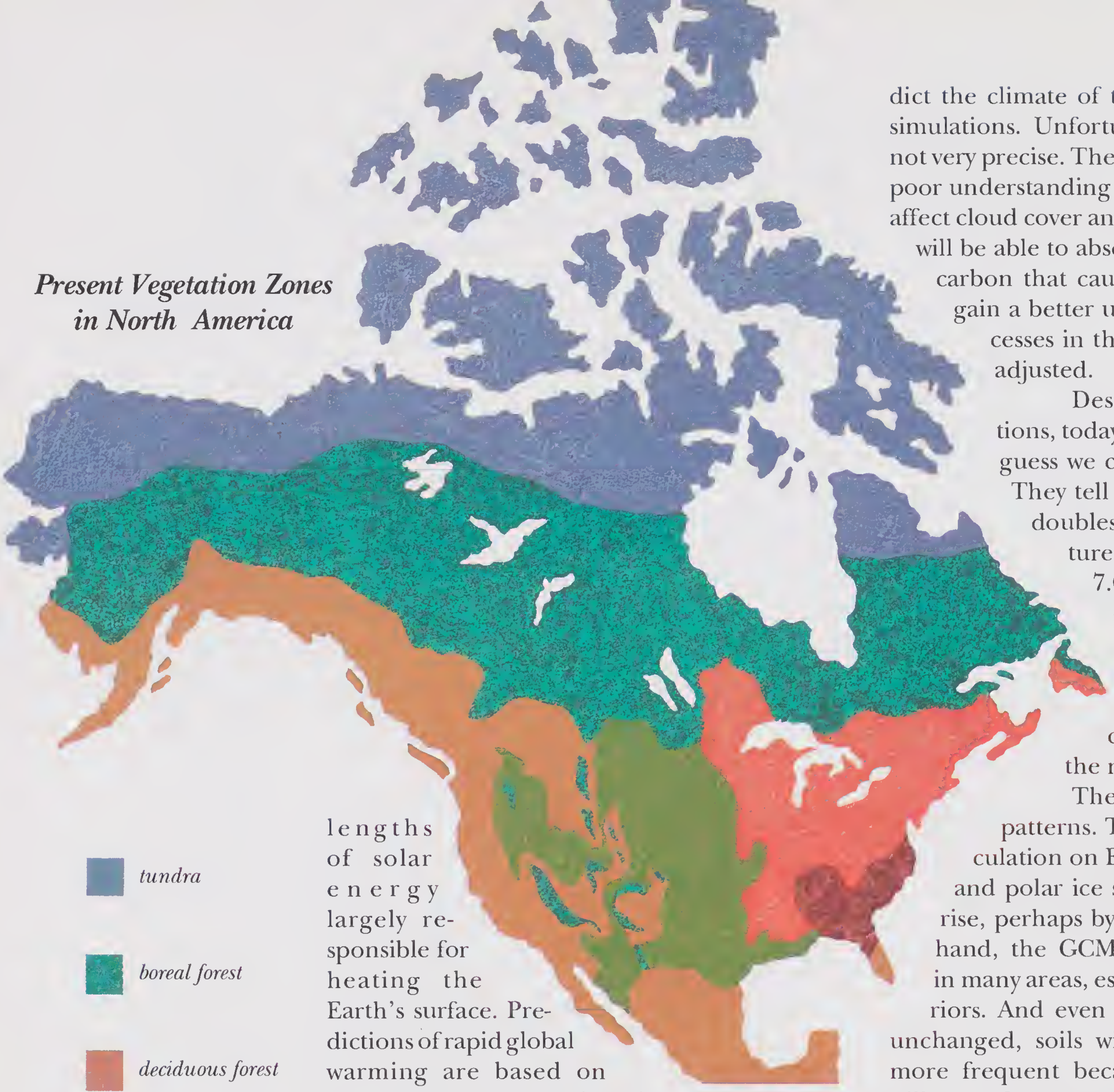
The morning chorus reached a crescendo, and he ticked off the familiar voices: catbird, brown thrasher, song sparrow, Carolina wren, chat, cardinal, prairie warbler. His bird lists were shorter than they used to be. The red-bellied woodpeckers had left after the dead trees fell in the tornado of 2047. Only a few Cape May and bay-breasted warblers passed through each year now, and he hadn't heard a cerulean warbler for 10 years. He could sometimes find a wood thrush in a low spot in the dry creek bed. He would go there next . . . .

Is this spring bird walk a plausible vision of the future? In the past, wild bird populations have been dramatically affected by the actions of humans. We have destroyed wetlands and tropical forests, converted prairies to agriculture, and broken expanses of temperate-zone forests into small fragments. All of these changes have adversely affected birdlife. Now, in addition to these changes, we must consider the possibility that rapid global warming could occur in the near future. Global warming would further alter plant communities, and the effects of these alterations could be devastating to many bird species.

But before we can predict how global warming might affect birds, we must understand why scientists are expecting this drastic change in climate. Concentrations of certain gases in the Earth's atmosphere are rapidly increasing as a result of human activities such as fossil fuel burning, forest destruction, and expanded livestock production. These gases, including carbon dioxide (CO_2) and methane, trap infrared radiation—the wave-

ILLUSTRATIONS BY STEVE CARVER

Present Vegetation Zones in North America



lengths of solar energy largely responsible for heating the Earth's surface. Predictions of rapid global warming are based on an expected increase in this "greenhouse effect" as the production of heat-trapping gases continues.

Scientists also predict future global warming because they have noted a long history of correlation between atmospheric CO_2 concentration and global temperature. Chemical analyses of air bubbles trapped deep within the ice of Antarctic glaciers allow us to reconstruct the global climate for the past 160,000 years. These data reveal that CO_2 concentration and temperature have fluctuated in concert; when CO_2 is high, temperature is also high, and vice versa. The level of CO_2 in the atmosphere today is far greater than at any time in the past 160,000 years. And, at the present rate of increase, CO_2 concentration will be nearly twice today's level by the middle of the coming century. In view of the historical correlation between CO_2 and temperature, and given the rapid increases in the production of greenhouse gases, future global warming seems likely. The relevant questions about global warming may not be whether or not it will occur, but rather "how much?" and "how soon?"

To answer these questions, scientists are using General Circulation Models (GCMs), which predict the climate of the future using computer simulations. Unfortunately, today's GCMs are not very precise. Their accuracy is limited by our poor understanding of how global warming will affect cloud cover and to what extent the oceans will be able to absorb the excess atmospheric carbon that causes global warming. As we gain a better understanding of these processes in the future, the GCMs will be adjusted.

Despite their current limitations, today's GCMs represent the best guess we can make about the future. They tell us that if atmospheric CO_2 doubles, average global temperature will rise by between 1.5 and 7.0 degrees Centigrade. So a 4 degree increase—in the midrange of this prediction—seems a reasonable estimate of climate change in North America in the next 50 years.

The GCMs also predict rainfall patterns. The amount of water in circulation on Earth will increase as glacial and polar ice start to melt; sea levels will rise, perhaps by several feet. On the other hand, the GCMs predict reduced rainfall in many areas, especially in continental interiors. And even if rainfall patterns remain unchanged, soils will be drier and droughts more frequent because higher temperatures will cause faster evaporation.

How will these changes affect our planet's birdlife? They will change the habitats where birds live. All landbirds depend to some degree on plants—trees, shrubs, grasses, and other vegetation—whether for food, cover, nesting, or as habitat for prey. One way of predicting future changes in vegetation is to look at how plants have responded to climate changes in the past. Tom Webb, a paleoecologist at Brown University, has analyzed fossilized pollen deposits from a wide range of sites in eastern North America. These deposits were laid down over the past 18,000 years, since the peak of the last ice age. As the glaciers retreated, spruces migrated north from an area of maximum abundance in what is today Missouri, Illinois, and Iowa to their present area of maximum abundance in central Canada. Other types of trees show similar northward expansions.

With this historical perspective, as well as our knowledge of what climates today's plant species can tolerate, we can extrapolate into the future. Using the climate-predicting GCMs, paleoecologists William Emanuel, Herman Shugart, and

Margaret Stevenson have drawn a map of North American vegetation that shows what plants would grow in different regions if atmospheric CO_2 concentrations were to double. Their study reveals a striking northward shift of climate zones. The climate regime that produces Arctic tundra essentially vanishes northward off the face of North America; the future climate in the region now occupied by tundra would support prairie grasslands or boreal spruce forest. The disappearance of the tundra would threaten the existence of snowy owls, jaegers, gyrfalcons, dunlins, sanderlings, lesser golden plovers, and other members of the spectacular Arctic-nesting avifauna.

The eastern deciduous forest climate zone would move northward hundreds of miles, replacing much of the boreal spruce belt. The GCMs predict relatively little temperature increase in the tropics, however, so neotropical migrants would be unlikely to expand their winter ranges northward. Thus, a shift in North American plant communities would force neotropical migrants to lengthen their flight paths. Birds such as red-eyed vireos would have to fly several hundred additional miles when returning to the eastern deciduous forest in the spring. Since the magnitude of the climate shift is predicted to increase with latitude, those migrants that nest the farthest north would experience the greatest extensions of their migratory paths. Migrants that nest in boreal forest, including many thrushes, flycatchers, and wood warblers, would have to hit a "target" that was not only much farther away from their wintering grounds, but also much smaller.

Meanwhile, forests in the southeastern United States would be drier than they are now. Such a change might convert the vegetation of the Southeast to a mixture of oak-pine scrub and savanna. Along the Gulf Coast, one might encounter subtropical woodlands like those now found in the hammocks of south Florida.

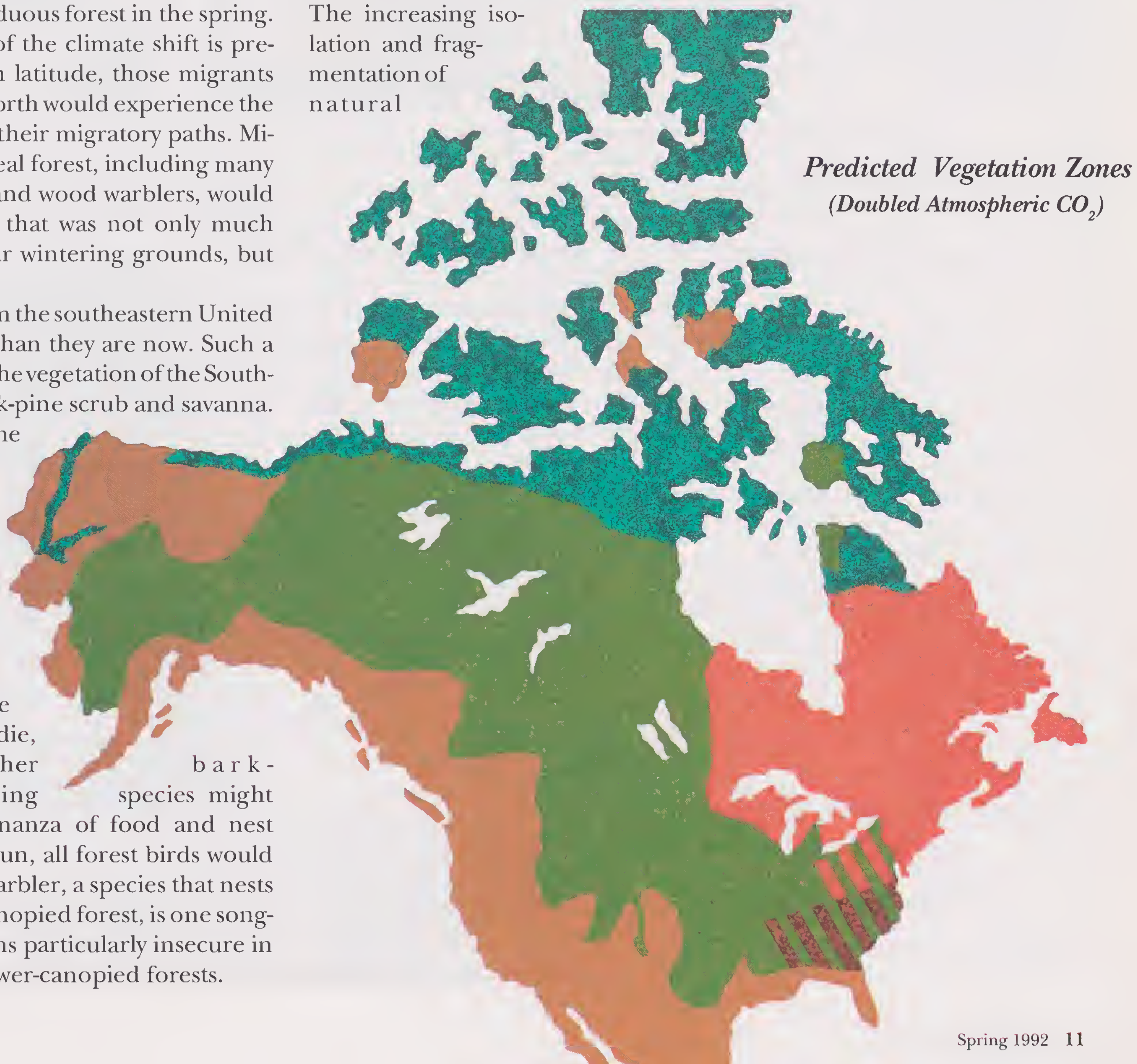
It is difficult to think of a single forest bird that would benefit from these changes. As large trees die, woodpeckers and other bark-gleaning, cavity-nesting species might reap a temporary bonanza of food and nest sites. But in the long run, all forest birds would suffer. The cerulean warbler, a species that nests in large tracts of tall-canopied forest, is one songbird whose future seems particularly insecure in a world of patchier, lower-canopied forests.

Changes in vegetation on the forest floor—from the present carpet of varied wildflowers and shrubs to dense tangles of just a few relatively drought-tolerant species—could have a profound impact on ground-nesting forest birds, including ovenbirds and Kentucky, hooded, black-and-white, and worm-eating warblers. Ground feeders such as thrushes might also be affected, in ways that are difficult to anticipate.

But in making these speculations, we are assuming that plant communities *can* move north or south as the climate changes. This assumption may be optimistic. Studies of the distribution of fossilized pollen suggest that many plants can keep pace with climate changes as fast as 5 degrees Centigrade in 1,000 years. But the rate of change that scientists are predicting—4 degrees Centigrade in 50 years—is an order of magnitude faster. Most trees don't reach reproductive maturity for 30 years. Can a tree disperse its seeds over 500 miles in just two generations? Margaret Davis, a forest ecologist at the University of Minnesota, believes that for most species the answer is no.

Even if they could keep pace with climate changes, plant populations face another barrier—human land use. The increasing isolation and fragmentation of natural

If the atmospheric concentration of CO_2 doubles (a conservative prediction), the average global temperature will rise, and scientists predict a consequent change in the distribution of major vegetation zones in North America. Climatic conditions suitable for tundra will scarcely exist; boreal and deciduous forest zones may move hundreds of miles northward. Grasslands may expand to the north and east, while the southeastern United States might support a patchwork of grasslands, deciduous shrubs, and southern pine.



Predicted Vegetation Zones
(Doubled Atmospheric CO_2)

habitats is an already-serious problem that can only intensify with climate change. In the Midwest, for example, forests are small islands in a sea of human development. On the edges of cities, suburban sprawl has converted vast forest and agricultural lands to residential and commercial tracts. Marooned on shrinking islands of natural habitat, plants will find it difficult to follow shifting climate zones northward across large inhospitable "seas" of soybeans and cement. Woodland plants such as trillium and mayapple that have low rates of seed production and spread vegetatively would be especially unlikely to move quickly over large distances. The overall result may be the loss of many plant species. The effect of this botanical poverty on birds is difficult to predict, but it is hardly likely to be favorable.

In the face of global warming, our standards for conservation may be too high. We should purchase as much land as we can get our hands on, no matter what its condition.

Of all the bird groups, aquatic birds may be the most severely affected by global warming. Salt marshes and other coastal wetlands, hemmed in on the landward side by human development, would be devastated by a rise in sea level. Prairie potholes in the upper Midwest, vital breeding grounds for many waterfowl species, would be drastically reduced by the drier, warmer conditions. These changes in coastal and inland wetlands, combined with the loss of tundra habitat, would constitute a "triple whammy" that would devastate our aquatic bird species.

Can any birds benefit from global warming? Species adapted to prairie grasslands and dense scrub might increase. If much of central Canada is indeed transformed by climate change into short-grass prairie, then Swainson's hawks, horned larks, longspurs, and Baird's, lark, and grasshopper sparrows could flourish. Tall-grass prairie birds such as the dickcissel and upland sandpiper might proliferate eastward if the deciduous forest becomes more open, unless they are excluded by agricultural activity. In situations where the eastern forest reverts to thickety scrub, brown thrashers, towhees, chats, catbirds, white-eyed vireos, and prairie warblers could be among the winners. This change would reverse the current trend of rapid declines in many thicket-nesting species detected by recent U.S. Fish and Wildlife Service Breeding Bird Surveys.

The possibility of rapid climate change adds a new dimension to the problem of avian conservation. In the past, conservationists have worked to buy and protect the best remaining examples of relatively undisturbed natural habitats. Our standards may be too high, however. A better strategy, in the face of global warming, may be to purchase as much land as we can get our hands on, no matter where it is and no matter what its condition. Even degraded land—abandoned industrial sites in our inner cities—should be considered; this acreage may be available at relatively affordable prices. Under conditions of global warming, ecological succession will convert such holdings into useful bird habitat, even without active management.

And while we must continue to buy up chunks of land, this strategy will not be sufficient in the event of rapid climate change. Most protected habitats in eastern North America are isolated fragments, highly vulnerable to biological impoverishment under conditions of global warming. Wildlife preserves should be connected by corridors of natural vegetation that can serve as dispersal routes for both plants and animals. Long corridors that run north to south would be especially beneficial.

But in the face of an ever-expanding human population and limited financial resources, conservationists and government agencies can't ever hope to obtain enough land to protect birdlife. We should also adopt long-term conservation strategies that don't depend on the existence of protected reserves. Our ultimate goal should be to create a conservation ethic and an American landscape so rich and diverse that protected areas are no longer necessary.

Amateur and professional ornithologists can start working toward this goal by embarking on an aggressive "Save our Birds" campaign, using the mass media to foster an appreciation for birds and to inform the public of the dangers birds face. Surveys show that of all wild creatures, birds are by far the most popular. The vast reservoir of public goodwill toward birds could be tapped once people know that many of our most colorful and popular birds are endangered. Imagine what would happen if an effort to "Save our Birds" became a public crusade? Residential yards, farms, industrial parks, and cemeteries all over America could be landscaped and managed in ways that maximized their attractiveness to the widest possible variety of birds. What if we could convince private landowners to commit an acre or more to great north-south corridors stretching hundreds of miles, along which plants and animals might track climate changes?

Who knows, future historians might write that an inordinate fondness for birds provided the means for saving us from ourselves. ■

Elliot J. Tramer is a professor of biology at the University of Toledo, Ohio.

Further Reading

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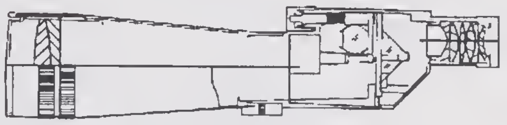

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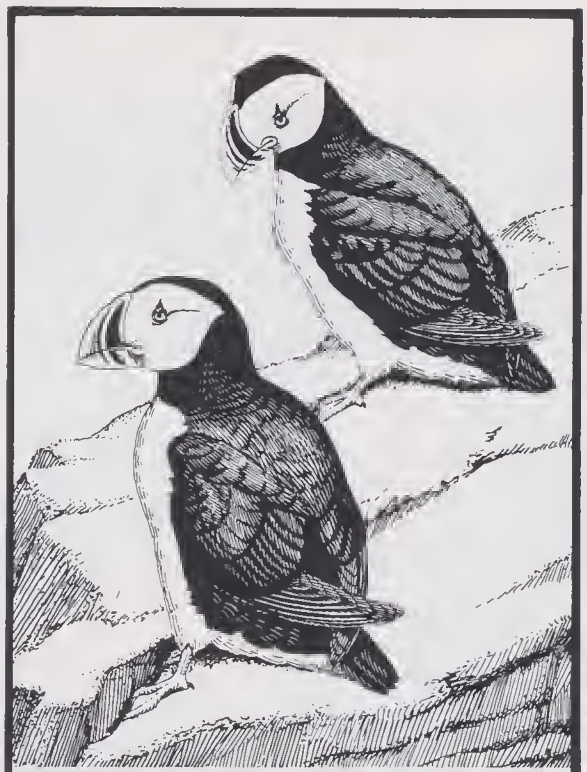

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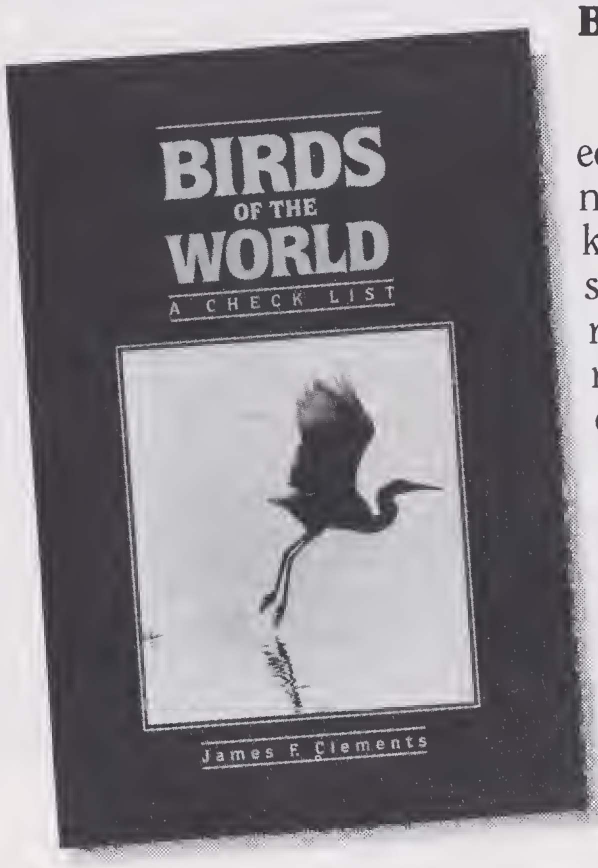
BIRDS OF THE WORLD: A CHECKLIST

By James F. Clements, Ph.D.



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From Puffins to Petrels

Text and photographs by Stephen W. Kress

Seabird colony restoration techniques developed off the Maine coast may offer new hope for threatened species

This coming July I'll be scanning the rugged shore of Seal Island in outer Penobscot Bay, Maine, with the hope of glimpsing an Atlantic puffin slipping into the boulders with a beak-load of herring. The sighting would mark the end to a nearly century-long absence of the species from Seal Island—once the puffin's stronghold on the Maine coast. It would also highlight another success for the National Audubon Society's "Project Puffin," an 18-year effort to reintroduce these seabirds to the area. Though puffins are not an endangered species, the techniques for reestablishing their colonies are directly applicable to other colony-nesting species, some of which are nearing extinction.

My interest in Maine seabirds dates back to 1969 when I became an ornithology instructor at the Audubon Camp on Hog Island in Muscongus Bay. While reviewing the literature on the birds of the area, I discovered the accounts of Arthur Norton, ornithologist and former curator of the Portland Society of Natural History. Norton told of the seabird colonies that once flourished in Muscongus Bay—an area where many northern species, such as Arctic tern, black guillemot, and Leach's storm-petrel, reached the southern limits of their ranges. His descriptions of the puffin colonies on nearby Eastern and Western Egg Rock both intrigued and saddened me. The birds had not nested on either island for nearly a century.

Norton explained that people took puffin eggs, and also trapped the birds for meat and to provide feathers for hats. Local fishermen would spread herring nets over the rocks after the puffins had retreated to their nest burrows for the night. As the birds emerged the next morning, they would become tangled in the nets, easy prey for the fishermen. Most of the breeding birds were trapped, which led to the puffin's extirpation from both islands by about 1880. Hunting and trapping also eliminated puffins from three other Maine coast islands (including Seal Island) by 1887.

Norton also mentioned the great flocks of Arctic and common terns that once nested on the Egg Rocks. These graceful birds were slaughtered for their feathers from 1886 to 1900. Norton's accounts of puffin and tern colonies on the Muscongus Bay islands contrasted sharply with the bird communities that I was showing to Audubon campers at these same islands in the late 1960s. Instead of puffins and terns, a trip aboard the the camp's boat, *Puffin III*, produced only great black-backed gulls, herring gulls, double-crested cormorants, and common eiders. But my imagination brought the puffins back to life at Egg Rock. In my mind I could see them darting in from the sea on quick wings, beaks loaded with fish for their young hidden under the boulders.

The island seemed impoverished by the loss of its original birdlife. I began wondering how I might go about restoring the puffins and terns. I researched the life history of the puffins, and the more I read, the more I became convinced that these "sea parrots" could be restored to their

Puffins nesting on the tiny islands of Muscongus Bay, Maine, were killed by the thousands for their meat and feathers. By the turn of the century, the birds' once-massive breeding colonies had vanished.

BHL

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original breeding place at Egg Rock. The fact that puffin chicks usually returned to nest at the same island where they hatched was already well established, but no one knew for certain whether the chicks' homing skills were innate or learned.

I developed a plan to take puffin chicks from a thriving colony in Canada and attempt to reintroduce them to Muscongus Bay. The chicks would be moved when about eight days old, and hand-reared until they reached fledging age at about 42 days. The young would then be released at Eastern Egg Rock. I hoped that they would accept the tiny island as their new home and return there several years later as breeders to found a new colony.

The plan seemed simple enough, and gaining support from within the Audubon Society was relatively easy. To make the project a success, however, I would have to convince others. No one had restored a seabird colony before, and many saw such work as intrusive, high-risk, and of doubtful value, since puffins still numbered in the millions elsewhere.

I argued that my plan was more than just an effort to restore puffins to one of their historic breeding places or to create a popular teaching resource for the Audubon Camp. I believed that if the puffin project were successful it would become a valuable model for other seabird restoration efforts—especially species that faced imminent extinction from excessive hunting, pollution, or predation by exotic mammals.

I worked with David Nettleship of the Canadian Wildlife Service, and together we developed a plan to collect puffin chicks on Great Island, Newfoundland, where approximately 160,000 puffin pairs nest, and move them to Egg Rock. The Newfoundland colonies in Witless Bay contained ample pairs to spare nestlings for the reintroduction effort.

The project started small, with only six puffin chicks transplanted from Great Island to Muscongus Bay in 1973. But from 1974 through 1981, when we stopped bringing puffin chicks to Eastern Egg Rock, 774 puffins were moved there. Ninety-five percent fledged successfully, thanks largely to the remarkable dedication of the research assistants who lived on the island and shared my dream of restoring seabird colonies.

Between 1974 and 1977 we experimented with several different burrow designs for rearing the chicks. At first, we tried building the burrows with ceramic chimney tiles, but found that they would overheat and also stain the birds' breasts with accumulated excrement. We then hand-excavated 100 two-foot-deep soil burrows, only to find that they would fill with water during heavy rains and almost drown the chicks. So we filled the holes and started using sod blocks to build above-ground burrows. This has been the most successful design.

The transplanted puffins were due to begin returning to Egg Rock in 1977, but I was concerned that even if they did return, they would not come ashore. Typically, puffins spend their first two or three years at sea. When they do come ashore in midsummer, they usually land on the loafing ledges of existing colonies where they socialize and begin looking for future nesting places. But Egg Rock had no puffin colony to lure them in. To solve that problem, we carved and hand-painted some larger-than-life puffin decoys and set them out on prominent rock outcrops where returning puffins would be sure to see them.

Our first returning puffin showed up at Egg Rock on June 12, 1977. The bird landed in the water near the island, but soon came ashore to inspect the decoys on the highest rock ledge. It was easily identified by its two leg bands, one metal, the other colored plastic, which we had placed on all the released puffins. We eventually identified 147 of them. Many were sighted at Matinicus Rock, and some had traveled all the way to Machias Seal Island, about 135 miles east of Egg Rock.

Although we visited Great Island, Newfoundland, several times to see if any of the transplanted puffins had returned to their birthplace, we never found any there. We concluded that the transplanted birds were cruising Maine's outer islands between the ages of two to four, and then settling down to breed by the time they were five. Once they reach breeding age, puffins seldom venture to other colonies.

Transplanted puffins were often seen at Egg Rock between 1977 and 1980, but the next important landmark for the project eluded us until 1981, when Evie Weinstein spotted a puffin with fish circling Egg Rock. We both watched breathlessly as it scrambled into the boulders with its catch. A food delivery could mean only one thing—puffins were breeding again on Egg Rock after a 100-year absence!

Five puffin pairs bred at Egg Rock in 1981, including one unbanded pair. Ten years later, in 1991, 16 pairs nested there. While the colony has not shown a dramatic increase, the numbers remain remarkably stable from year to year, and our studies show that most pairs rear their young successfully. In 1991, 24 of the 32 breeding birds were wearing bands identifying them as transplanted puffins from Newfoundland. The eight unbanded breeders demonstrated that the colony is also gaining recruits from other colonies or from young produced at Egg Rock.

While waiting for the puffins to return to Egg

Rock, I also launched a program in 1978 to restore an Arctic tern colony, which had disappeared from the rock in 1936, displaced by growing numbers of herring and great black-backed gulls. To assist both the puffin and tern restoration efforts, the U.S. Fish and Wildlife Service (USFWS) had eliminated most breeding gulls from Egg Rock by 1975, but as late as 1978, terns had not recolonized the island. To encourage them, I asked Donal O'Brien, a noted bird carver and conservationist, to create a tern model that we could replicate to attract other terns. In the spring of 1978 we set out 33 decoys and watched excitedly as terns immediately settled among them.

We set out the models again in 1979 and 1980, and played nonstop recordings of tern courtship calls. In 1980 our efforts were rewarded when 80 pairs of common and Arctic terns nested among the decoys and tape speakers. The colony has grown dramatically since then, with nearly 1,000 pairs of common and Arctic terns nesting there in 1991, alongside 50 pairs of endangered roseate terns and at least 156 pairs of laughing gulls, which are uncommon in Maine.

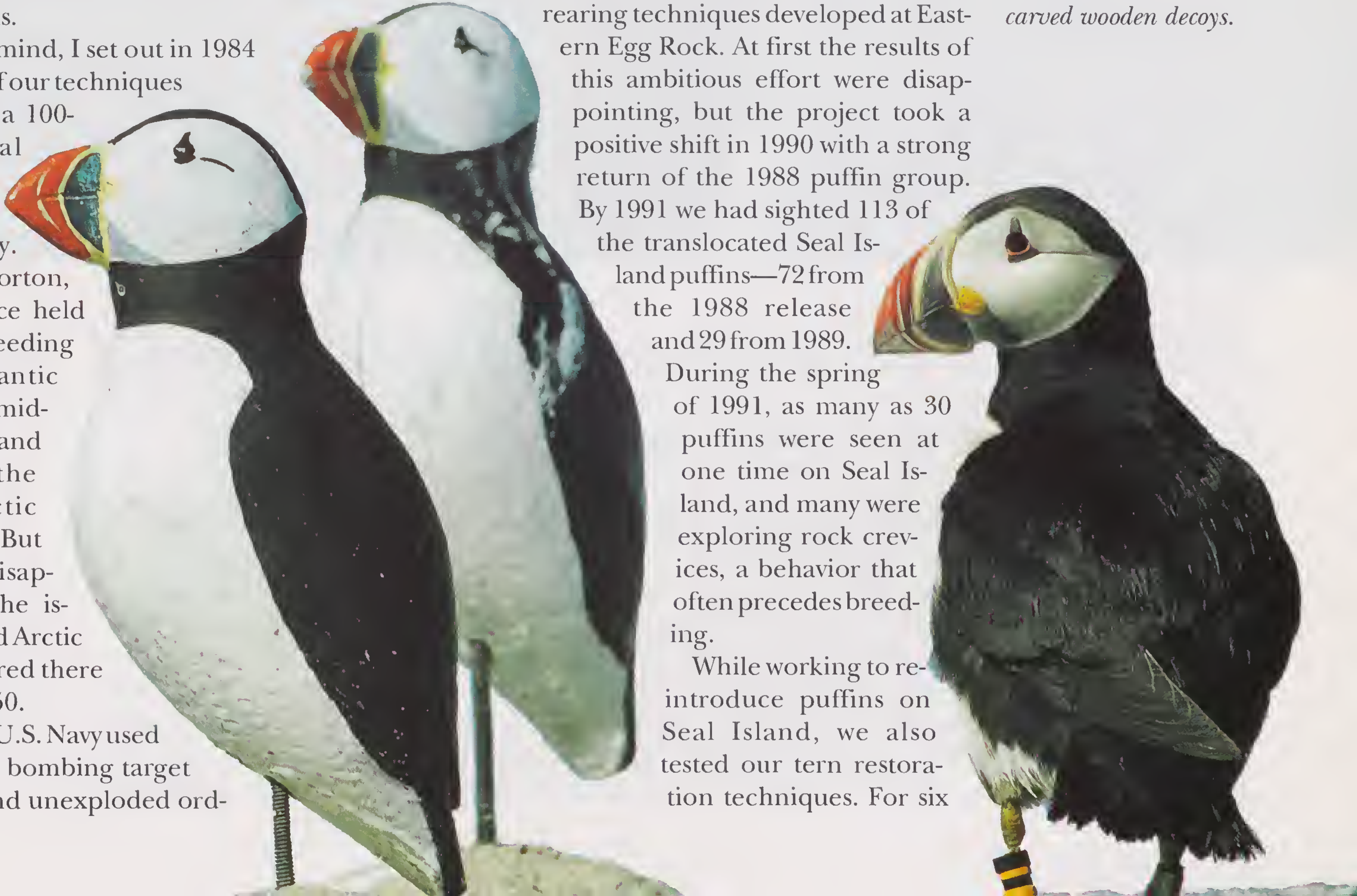
Eastern Egg Rock is owned by the Maine Department of Inland Fisheries and Wildlife and managed by the National Audubon Society as the Allan D. Cruickshank Wildlife Sanctuary. The island demonstrates how active seabird management can revive an historic assemblage of seabirds. But since our primary goal was to develop techniques with broad application, I was eager to see if we could replicate our Egg Rock successes on other islands.

With this in mind, I set out in 1984 to apply some of our techniques at Seal Island, a 100-acre National Wildlife Refuge in outer Penobscot Bay. According to Norton, Seal Island once held the largest breeding colony of Atlantic puffins on the mid-coast of Maine, and also one of the principal Arctic tern colonies. But puffins had disappeared from the island in 1887 and Arctic terns had not bred there since about 1950.

Because the U.S. Navy used Seal Island as a bombing target in the 1950s, and unexploded ordnance still remains in the ground, it took us three years to obtain permission to set up a field camp. We were finally ready in July 1984 to resume the transplant program, bringing puffins from Great Island, Newfoundland, to Seal Island. The Canadian Wildlife Service continued its cosponsorship of the project. David Nettleship helped us to collect puffin chicks on the slopes of Great Island, while the USFWS gave us permission to conduct research at Seal Island and assisted us again with gull control.

Between 1984 and 1989, we successfully fledged 912 transplanted puffin chicks using the rearing techniques developed at Eastern Egg Rock. At first the results of this ambitious effort were disappointing, but the project took a positive shift in 1990 with a strong return of the 1988 puffin group. By 1991 we had sighted 113 of the translocated Seal Island puffins—72 from the 1988 release and 29 from 1989. During the spring of 1991, as many as 30 puffins were seen at one time on Seal Island, and many were exploring rock crevices, a behavior that often precedes breeding.

While working to reintroduce puffins on Seal Island, we also tested our tern restoration techniques. For six



Project Puffin director Stephen Kress (above) places a puffin chick in one of the artificial nest burrows at Egg Rock. Young puffins typically spend their first two or three years at sea before returning to the place where they fledged. Below, a puffin Kress released at the same site years earlier perches next to some carved wooden decoys.

> *The restored puffin colonies teach the vital lesson that habitats are more complete, interesting, and viable when they contain their fullest complement of wildlife.*

Puffin chicks were collected on Great Island, Newfoundland (above), where the birds are abundant, and moved to Maine. Kress also tried his reintroduction techniques with Arctic terns (above right), but instead of transporting chicks from other colonies, he set out decoys and played tape recordings of active colonies to lure in potential nesters.

years we controlled gull populations, set out decoys, and played tape recordings of tern colonies. Finally, in 1989, we were rewarded when 16 pairs of Arctic terns and one pair of common terns nested among the decoys. The colony increased to 115 pairs of Arctic and 15 pairs of common terns by 1990, then increased dramatically the following year to 281 pairs of Arctic, 369 pairs of common, and four pairs of roseate terns.

The potential nesting space for terns on 100-acre Seal Island is truly impressive. Equally important, our studies of tern feeding habits showed that the island has abundant food for the birds. In the 1991 breeding season we found that nearly every tern egg produced a fledgling—an impressive success ratio.

Since the earliest days of the puffin project, we had hoped to apply the techniques learned in Maine to help some of the 30 endangered seabird species. With the help of a Rolex Award for Enterprise grant in 1987, we finally had our chance. The following year we launched a program in the Galápagos Islands. The Galápagos National Park and the Charles Darwin Research Station invited Richard Podolsky and me to test our seabird attraction techniques to help the endangered dark-rumped petrel in the highlands of Santa Cruz Island.

Dark-rumped petrels are crow-sized seabirds that share many behaviors with puffins. They usually breed for the first time when they are five years old and lay one egg in an excavated burrow. Both parents take turns incubating the egg and feeding the chick. Unfortunately, humans have introduced many predators to the Galápagos Islands, either accidentally or deliberately—Norway and black rats, dogs, cats, pigs—and these are devastating the petrel breeding colonies. Petrels are vulnerable to predators during their entire 50-day incubation period as well as their 110-day chick-rearing period. In some years all the young petrels on the island are destroyed by predators.

To reduce the petrel predation, we tried to encourage the birds to nest in areas without predators, or in areas where the predators could be controlled more easily. Assisted by the Library of Natural Sounds at the Cornell Laboratory of Ornithology, we produced a set of experimental tapes of petrel vocalizations. We tested them in the field to see which ones would be most effective for attracting petrels. A tape recording of petrel colony sounds re-recorded over itself proved to be the most seductive, perhaps because it sounded like a large, thriving colony. During 1988 and 1989 we hand dug 160 burrows within an extinct volcano in the Santa Cruz highlands, where a few petrels were making a last stand against the exotic mammals. The new burrows attracted petrels immediately. By the fourth year of the study, six pairs successfully nested in the new burrows and many other pairs showed promise of nesting there in the future.

Our study suggests that wildlife managers can minimize predator damage by influencing where the birds nest. The attraction techniques we are developing could someday be used to encourage dark-rumped petrels to nest on an island that is completely free of exotic predators, making intensive, long-term predator control unnecessary.

Seabirds are often reluctant to pioneer new

EVELYN WEINSTEIN

Kress took the seabird colony restoration techniques developed in Maine to the Galápagos Islands (above), where he tried to encourage endangered dark-rumped petrels (left) to nest in protected areas. Above right, researchers adjust a tape player used to lure petrels to new nest sites.

nesting areas, but our studies demonstrate that by attracting the birds with decoys and tape recorders we can overcome their natural reticence and encourage them to establish new colonies. Such signals give birds the impression that the habitat is safe for breeding. Even highly colonial birds such as terns and puffins will take a chance on breeding in a new area if they think that large numbers of their species are already committed to the site. And once a bird is committed, it may breed at the site for the rest of its life, which may be more than 20 years.

Wildlife managers can use these techniques to encourage seabirds to recolonize former breeding sites, though the outcome of these efforts cannot be assured. Survival of transplanted birds varies greatly from year to year (as does survival of wild birds) and large numbers of young birds must be moved to the new area to have any hope for even a modest success. Establishing a seabird colony may take a decade or more, whether a project uses translocation of young or attraction of adults. The first years of any reintroduction project will test the endurance of researchers and supporters, but the Egg Rock puffins demonstrate that a puffin colony can be restored through a committed effort over a long period.

The future for puffins and terns on the Maine coast is brighter today than it was a decade ago. The additional colonies, on islands separated by miles of open water, minimize the chance that all the breeding seabirds in the area could be devastated by disasters such as disease, predation, and pollution. New colonies also broaden the opportunities for public viewing. Like whales, porpoises, and other charismatic sea life, puffins capture the enthusiasm of thousands of people who venture out on special seabird-watching tours each year. The restored puffin colonies teach the vital lesson that habitats are more complete, interesting, and viable when they contain their fullest complement of wildlife.

Ten years after the first reintroduced puffins returned to breed, the Egg Rock colony has grown and appears stable. And the same techniques that were successful there are working at Seal Island. Today when puffins whip past a crowd of Audubon campers aboard the *Puffin III*, and thousands of terns lift from the island in a unified movement, I am convinced that this small corner of the ocean is more secure and interesting thanks to our efforts. ■

Stephen W. Kress is a biologist with the National Audubon Society and an associate of the Cornell Laboratory of Ornithology. In addition, he is director of the Puffin Project, which he started in 1973.

Adopt a Puffin

Project Puffin is supported entirely by private contributions to the National Audubon Society's Fratercula Fund. Individuals or groups can help the project by "adopting" one of the Eastern Egg Rock puffins. For each $100 donation, the Project Puffin staff will select a puffin to sponsor. Participants receive a certificate with a color photo of their puffin and a subscription to the group's annual newsletter, Egg Rock Update. *Contributions to the project are tax deductible.*

For more information, write to: Project Puffin, National Audubon Society, 159 Sapsucker Woods Road, Ithaca, New York 14850.

A BASIC BOX *for a* BASIC NEED

by Scott Shalaway

With these easy plans, anyone can provide vital nest sites for birds

Whether they are natural or artificial, dark holes usually arouse the curiosity of cavity-nesting birds. At left, a female kestrel investigates a bird box.

One size fits most. It sounds like an ad for T-shirts or baseball caps, but in this case I'm talking about bird boxes. One simple design in one basic size provides suitable housing for a wide range of common cavity-nesting birds—chickadees, bluebirds, titmice, nuthatches, wrens. Enlarge the box and the entrance hole and the same design will readily accommodate great crested flycatchers, kestrels, screech-owls, and wood ducks. With this one design and a few tools, nearly anyone can create functional bird boxes, providing valuable nest sites for birds.

Despite the fact that nest boxes are commonly called "birdhouses," only about 85 of the 650 bird species that breed in North America actually nest in cavities, and fewer than half of those use boxes regularly. Fortunately, the ones that do nest in bird boxes are among America's favorite birds.

You've probably seen, and perhaps used, birdhouses of many shapes and sizes: tiny A-frames, clay pots, wooden apples, hollow gourds, or even one of those elaborate Victorian mansions available for purple martins. Although fancy birdhouses may attract human attention, birds are not impressed. All they want is a safe place to nest. Dark holes arouse the curiosity of cavity-nesters, and most will investigate a nest box as enthusiastically as a natural cavity. Since most people don't have the tools or skills necessary to build a fancy structure, my advice is to keep bird boxes simple.

Woodpeckers also nest in cavities, but because drilling the hole is an important part of their breeding behavior, most rarely use nest boxes. One way to lure woodpeckers to a box is to pack it full of wood shavings. This allows woodpeckers to cheat; they can nest in a box and still satisfy their need to "excavate."

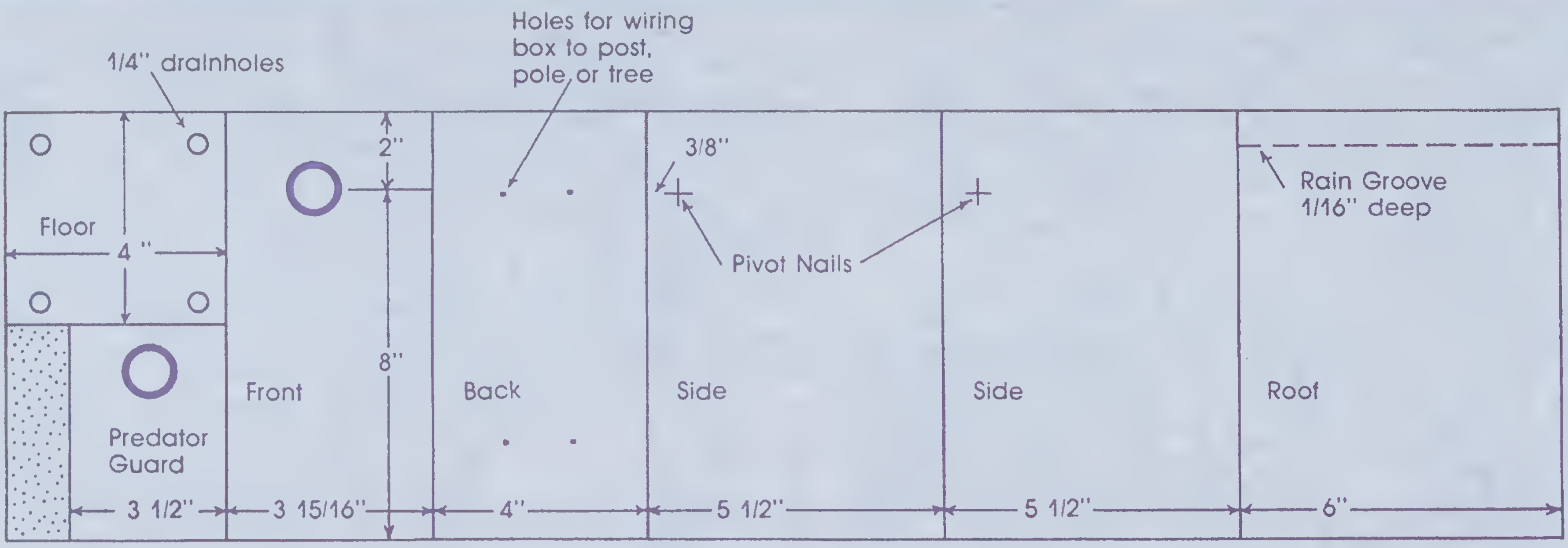
Don't be discouraged if your target birds ignore the nest boxes at first. It may take a year or two for birds to accept them, especially if natural cavities are available nearby. Be patient. I feel lucky if 25 percent of my new boxes are used the first year.

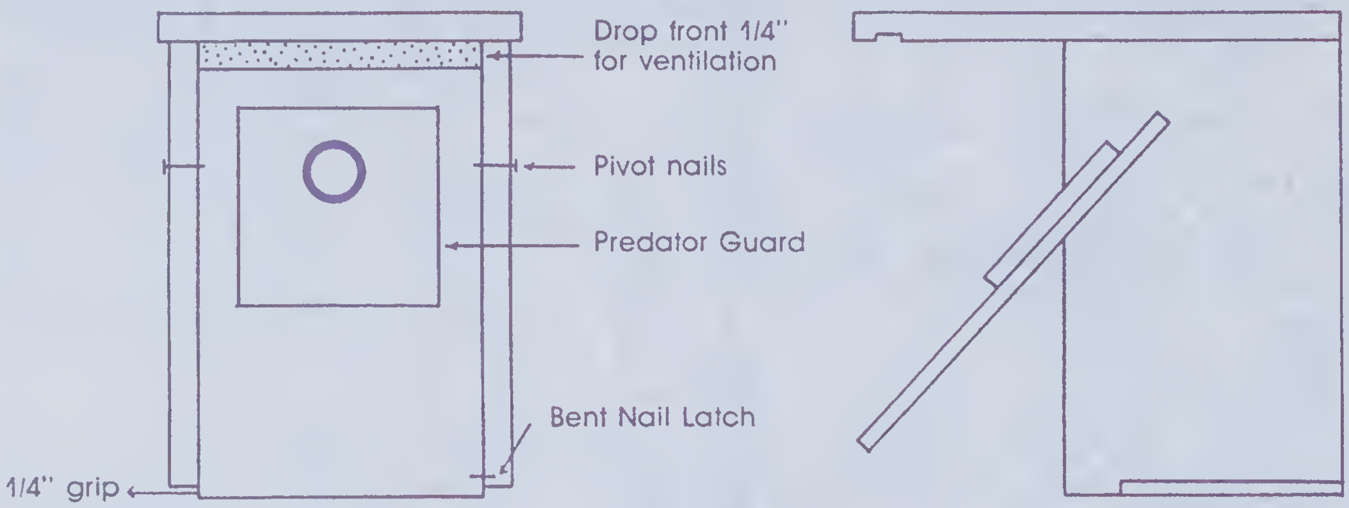
Boxes should be cleaned out in the fall and just before nesting season begins. Untended nest boxes often attract wasps, deer mice, and flying squirrels. Bird boxes must have a door to facilitate cleaning and maintenance. A sealed box is virtually useless after birds nest in it once or twice. I prefer boxes with front or side openings because they can be opened during the nesting season with minimal disturbance to the birds. They are also easy to clean.

Nest boxes for all species except wrens should be firmly anchored to a post or tree trunk (wrens don't mind nesting in a free-hanging box). If snakes or raccoons are a problem, place a metal skirt around the pole below the nest to discourage these common and curious predators. You can also grease the pole.

Where you hang your bird boxes will determine which birds use them. The key is to place the box in suitable habitat for the birds you wish to attract. Bluebirds, for example, nest only in open country—hay fields and pastures with scattered trees. If you place your box in dense forest you will never get any bluebird takers.

Look for bluebirds to start building nests in March or April. Other cavity-nesters follow soon


1/4" drainholes
Holes for wiring box to post, pole, or tree
Floor
4"
2"
3/8"
Pivot Nails
Rain Groove 1/16" deep
8"
Front
Back
Side
Side
Roof
Predator Guard
3 1/2"
3 15/16"
4"
5 1/2"
5 1/2"
6"


Drop front 1/4" for ventilation
Pivot nails
Predator Guard
Bent Nail Latch
1/4" grip

ASSEMBLY PLANS

Cut bird box pieces from a sheet of ¾-inch exterior plywood and assemble with galvanized nails or screws. One 4-by-8-foot sheet of plywood should provide enough material for about 10 boxes. Exterior plywood weathers well and galvanized fasteners don't rust, so the boxes usually last a long time.

You can use other lumber besides plywood, but be sure that it is at least ¾-inch thick. Heavy stock insulates nests against spring chills and midsummer heat.

Painting or staining nest boxes is unnecessary (in fact many birds seem to prefer weathered-looking boxes). But if you do want to paint your box, use light-colored earth tones; they absorb less heat. Never paint the inside of your boxes; fumes may be harmful to the birds inside.

Be sure to extend the roof at least three inches past the front of the box to protect the entrance hole from driving rain. Also drill four ⅜-inch holes in the floor so the box will drain if any water gets inside.

For a latch system, use a bent pivot nail (or purchase an inexpensive L-screw), which will allow easy access for checking and cleaning the box.

Make the box 10 to 12 inches deep. The deeper the nest is in the cavity, the safer it is from predators. Place the center of the entrance hole 2 inches below the top of the box. Keeping the hole high makes it more difficult for raccoons, cats, and other predators to reach in and raid the nest. Adding a predator guard also limits this "reaching distance." Another precaution is to install three ½-inch dowels on the inside of the box just below the hole. They should extend an inch into the box and be spaced ¼-inch apart.

Never put a perch on the outside of a box. Cavity-nesters have strong feet and can easily cling to wood surfaces, and a perch only invites house sparrows to use the box.

Tie boxes to posts or trees with plastic-coated #12 or #14 electrical wire. The wire can be loosened annually to minimize damage to live trees.

SPECIFICATIONS FOR NEST BOXES

SPECIES	*Floor size (inches)*	*Height of box (inches)*	*Hole diameter (inches)*	*Height above ground (feet)*	*Habitat*
Wood duck*	12x12	24	4	3-30+	Wooded swamps, bottomlands
American kestrel*	8x8	15-18	3	8-30	Farmland
Screech-owls*	8x8	15-18	3	8-30	Farmland, orchards, woods
Saw-Whet owl*	6x6	15-18	2-½	8-30	Open woods, edges
Downy woodpecker**	4x4	10-12	1-½	5-15	Open woods, edges
Red-headed woodpecker**	6x6	12	2	10-20	Open woods, edges
Hairy woodpecker**	6x6	12	1-⅝	10-20	Open woods, edges
Northern flicker**	7x7	16-18	2-½	5-30	Farmland, open country
Great-crested flycatcher	6x6	10-12	1-9⁄16	6-20	Open woods, edges
Ash-throated flycatcher	6x6	10-12	1-½	6-20	Mesquite, desert, riparian zones
Tree swallow	5x5	8-10	1-½	3-8	Open land near pond or lake
Violet-green swallow	5x5	8-10	1-½	3-8	Open land near pond or lake
Chickadees	4x4	10-12	1-½	4-15	Open woods, edges
Titmice	4x4	10-12	1-½	4-15	Open woods, edges
Nuthatches	4x4	10-12	1- ½	4-15	Open woods, edges
Wrens	4x4	10-12	1-½	3-10	Old fields, thickets, bottomlands
Eastern bluebird	4x4	10-12	1-½	3-6	Open land with scattered trees
Western bluebird	5x5	10-12	1-9⁄16	3-6	Open land with scattered trees
Mountain bluebird	5x5	10-12	1-9⁄16	3-6	Open land with scattered trees
Prothonotary warbler	4x4	10-12	1-½	3-12+	Wooded swamps, streams
House finch	5x5	10-12	1-½	5-12	Near houses in town & country

* *Line floor with 2 to 3 inches of wood chips to cushion eggs and simulate natural cavity*

** *Pack box full of sawdust. Woodpeckers will "excavate" their own cavity.*

+ *Best place is on a post equipped with a metal anti-predator skirt 3 to 4 feet above open water.*

after. To increase the odds that your boxes will be accepted as a part of the landscape, be sure to get the boxes up by March 1. But don't be surprised if some boxes are used well into summer. Bluebirds and house wrens raise as many as three broods each year.

If you place boxes in deep woods, avoid using plywood. The glue that holds plywood together is an irresistible hors d'oeuvre to squirrels and porcupines. (I learned that the hard way!) You'll have many takers if you hang your boxes within 20 yards of the woodland edge. Chickadees, titmice, wrens, and even nuthatches will nest in edge locations when competition for natural cavities is keen.

The most rewarding part of providing artificial nest sites for birds is monitoring the boxes. You should check them at least once a week and record your findings in a notebook. Approach the box quickly, open it, note the contents, then back off. This should take no more than 30 seconds. If you find an adult bird on the nest incubating eggs, leave immediately and do not disturb the box again until you see the adults feeding the young. Also, never disturb a box full of chicks near fledging age. They may leave the nest prematurely, ensuring almost certain death.

And always expect the unexpected when you check boxes. Much can happen in a week. It's not unusual to find a deer mouse, flying squirrel, or rat snake in a box that only days before held an active nest.

My boxes are based on a plan designed by Richard Tuttle for the Ohio Department of Natural Resources. I've made a few minor changes, but the basic plan remains intact. The beauty of this design is its simplicity. Believe me, I'm no carpenter, but in the last 10 years I've built hundreds of nest boxes. Most are still in use.

Providing nest boxes is one of the easiest and most enjoyable ways to observe wildlife. And nothing is more rewarding than helping birds to successfully raise their young. ■

Scott Shalaway is a writer, photographer, and syndicated newspaper columnist.

KILLING THEM *with* KINDNESS

by Paul W. Sherman and Brad Semel

If set up improperly, nest boxes can do more harm than good to nesting wood ducks

The rickety floor of the ancient duck blind creaked and strained as we clambered out of our johnboat. Dried oak leaves woven through the wire mesh framework rustled in the dawn breeze. It was 4:30 on a chilly March morning at the Duck Creek Wildlife Management Area, an expanse of flooded bottomland forest and limestone ridges tucked away in the boot heel of southeastern Missouri. We stuffed our gear—binoculars, notebooks, hot chocolate, folding stools, and a car battery—inside the blind and squeezed in after it.

Fifty feet in front of us, a semicircle of 12 wooden nest boxes, each mounted on a metal pole, was barely visible in the dawn mist. A 200-foot-long catwalk that we had laboriously constructed through the swamp's muck led from the blind to each box. We waited quietly, shivering. As the first rays of sunlight reached the overhanging cypress boughs, our quarry swam into view: a pair of wood ducks, the female in the lead.

Without hesitation the birds paddled over to box #8, and the female flew up and disappeared into the entrance hole; the male remained outside, calling softly. We knew this particular female well. The week before we had banded her and attached to her bill a small green marker with the number 3 painted on it. Each dawn for the past three days Gr-3 had visited box #8 briefly to lay an egg. Today she would lay her fourth.

Suddenly, whistling wings announced the arrival of four more pairs of woodies. The birds alighted on the water and swam straight to box #8. One female flew to the entrance hole and disappeared inside. We heard the sounds of a struggle and saw the box shake violently. After a few minutes, the intruder reappeared, called loudly, and flew off accompanied by her mate. Then a second female entered and exited the box, then a third.

What was going on? A clue presented itself soon after we saw the third female, marked Gr-1, shoved violently out of the hole. She flew to a nearby stump and unceremoniously laid an egg on top of it. Had the other females laid inside the box? When the fourth female entered box #8, we attached our car battery to a pair of wires leading from the blind to the box. Instantly the electricity burned through a thread inside the box, springing a shutter that blocked the entrance hole. Quickly we negotiated the narrow catwalk, opened the box lid, and removed Gr-3 and the intruder. Then we counted the clutch. Instead of the four eggs we had expected to find, there were seven. In only 21 minutes, five females had entered the box and four had laid eggs!

This series of events was an extreme case of a behavior called intraspecific brood parasitism, in which a bird lays eggs in a nest belonging to another female of the same species. Among birds, this behavior has been recorded in about 100 species. How common it really is we don't yet know because it is so hard to detect—much harder than interspecific (between-species) parasitism. For example, when a cowbird parasitizes a warbler, the eggs and chicks of the host and parasite look markedly different, but when a wood duck parasitizes another wood duck, host and parasitic eggs and ducklings are virtually indistinguishable. Direct observations like ours,

STEVEN D. FACCIO

Decimated in the last century by hunting and habitat loss, wood ducks have made a comeback in North America, largely thanks to the nest boxes supplied by wildlife agencies and conservation groups. New research, however, suggests that traditional nest box placement—in clusters over open water—may not be the best for the birds.

BHL

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BRAD SEMEL (2)

Wood ducks sometimes lay eggs in the nests of other females; this "dump-nesting" can reach extreme proportions when nest boxes are placed in highly visible locations. For example, the nest below contains 25 eggs, far more than a single female can incubate—and it has been abandoned. In contrast, the nest above contained a normal clutch that hatched successfully. Far right, author Paul Sherman checks a nest box at his Missouri study site.

however, coupled with recent advances in molecular genetics techniques such as DNA fingerprinting, have enabled scientists to uncover many new cases of intraspecific parasitism.

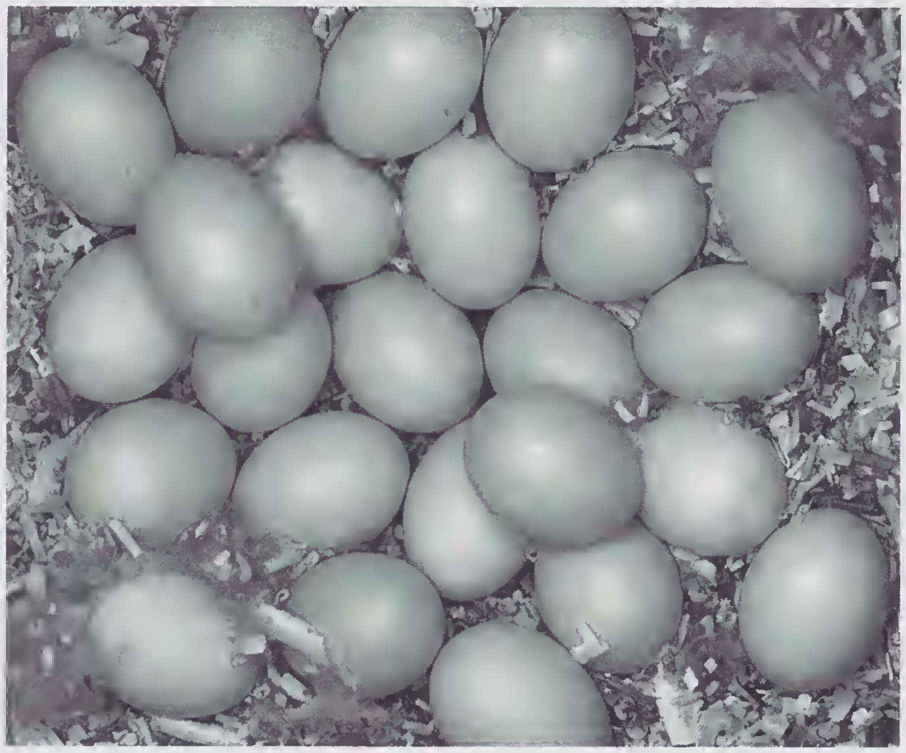
Brood parasites gain several evolutionary advantages from their behavior. Because their young are raised by others, parasitic females avoid the physiological costs and dangers associated with incubation and parental care. Parasitism is also a way for females who can't find a nest site to reproduce. Finally, parasitism spreads among multiple nests the risk of losing progeny to predators. In general, nest owners would be expected to resist parasitism to avoid misdirecting their parental efforts. In special circumstances, however, a host may benefit from being parasitized. For example, if a young female who is unable to find a nest site lays a few eggs in her mother's nest, the reproduction of both may be enhanced. Also, as the size of a group of eggs or chicks increases, a predator will be more likely to take a parasite rather than one of the host's own progeny.

Intraspecific parasitism is particularly common in species with precocial young, such as waterfowl. Parasitism reaches an extreme among wood ducks nesting in man-made boxes. Often the majority of the boxes in an area are parasitized and huge clutches, many times larger than a female's egg-laying capacity, are commonly observed. Why does such "dump nesting" occur, and what are its consequences for wood duck populations?

As behavioral ecologists, we approach such questions from an evolutionary perspective. Darwin's theory of natural selection predicts that individuals will behave in ways that will increase their reproductive output. Investigations of this prediction are usually thought of as "basic research"—pursued primarily to discover fundamental principles rather than to solve specific problems. Yet as we studied wood ducks we realized that our basic research findings might be useful to the more "applied" fields of conservation biology and wildlife management.

To understand what we hoped to find out about Gr-1, Gr-3, and the others, it's helpful to know a little more about wood duck nesting biology. Wood ducks breed throughout the central and eastern United States and southern Canada as far west as the Great Plains, and in isolated areas on the Pacific coast. In the early spring females select hollow tree cavities in dense bottomland forests and swamps. Suitable nesting cavities must be high off the ground, large enough to accommodate the nesting female and her clutch of 8 to 12, and unoccupied by competitors (squirrels) or predators (owls and raccoons). Such nest sites aren't common—they're usually widely spaced and well concealed in the forest canopy.

In areas where natural cavities are rare or competition for them is intense, people often put up artificial nesting structures. Indeed, nest boxes have become one of the most recognizable habitat improvements in the United States. State and federal wildlife agencies, civic organizations such as the Boy Scouts, conservation groups, and individual landowners together have erected more than 90,000 nest boxes in the Atlantic and Mississippi flyway states alone. Local wood duck populations have increased as a result, and the species' range has expanded.



Following the recommendations of publications promoting nest box use, well-meaning people typically group their boxes in highly visible locations, such as the middle of a pond or wetland. This practice may increase box occupancy rates, but it also forces the normally solitary wood ducks to nest colonially. We investigated whether this social restructuring altered the birds' behavior. The results of our research indicate that unfortunately, the answer is yes.

Our study suggested that in a dense box-nesting population the reproductive advantages of parasitism are drastically altered. Whereas only 25 to 30 percent of tree hole nests are normally parasitized, and whereas the ones that are usually contain only a few foreign eggs,we recorded a 95 percent parasitism rate and clutch sizes of 30 to 40 eggs in our Missouri study. This high rate of parasitism occurred even though 50 percent of the available nest boxes were unused. In the boxes that were used, clutches developed at erratic rates, often increasing by six to eight eggs in one day. Because female wood ducks can lay only one egg per day, many different females must have contributed to each clutch. Eggs were laid parasitically at all stages of the nesting cycle, from clutch initiation until just before hatching.

Most importantly, reproductive success declined as clutch size increased: a significantly lower proportion of eggs hatched in clutches with more than 16 eggs than in clutches of 10 to 14 eggs. There were several reasons for this outcome. First, females generally abandoned superlarge clutches, in which the majority of eggs were not their own. Even when large clutches were not abandoned, the eggs lay four to five layers deep in a box, so the bottom ones were not turned or incubated adequately. Often eggs were crushed when females struggled to exclude would-be parasites. Then, when the crushed eggs spoiled, bacterial infections killed still more eggs. Furthermore, parasites often laid their eggs after incubation had begun, and these eggs perished when the mother left the box with her own synchronously-hatched ducklings. Finally, parasitic females were sometimes forced to lay eggs in inappropriate places—such as the one Gr-1 laid on top of the stump at Duck Creek.

Extreme brood parasitism is clearly bad news for wood duck reproduction. Why, then, does it occur? Our behavioral observations suggest that parasitism is triggered when females see conspecifics enter or leave active nest sites. When boxes are clustered in visible locations it is virtually impossible for a female to enter her own nest unobserved or to fight off the large number of would-be parasites that are attracted. By concentrating nest boxes in visible places, humans have inadvertently made parasitism too easy. Population densities increase and clutch sizes skyrocket, leading to social pathologies, reproductive inefficiency, and eventually to precipitous crashes in duckling production. These effects have been reported at refuges across the country, particularly in the South where wood duck populations are high. It appears that we are killing wood ducks with kindness.

BRAD SEMEL AND PAUL SHERMAN

Nest boxes therefore present a management dilemma: how can we use them to enhance wood duck reproduction while keeping dump nesting in check? To address this issue, we have experimented with box placement. We reasoned that if females could not see each other entering boxes—which is the normal situation in nature—they would be forced to find their own nest sites. This, in turn, should reduce dump nesting and raise productivity.

To test this hypothesis we erected nest boxes in three configurations at two wildlife management areas in northeastern Illinois. *Visible-isolated* boxes were mounted individually on poles over open water, in obvious locations but out of sight of other boxes. *Visible-clumped* boxes were mounted in pairs, back-to-back, on poles over open water, again in obvious places. These two configurations mimicked common management practices. In addition, we positioned individual *well-hidden* boxes 10 to 18 feet off the ground in deciduous trees, 30 to 60 feet from the edge of the nearest water and at least 600 feet apart. This placement is more like the natural distribution of isolated tree cavities.

We have now run this experiment for five years, two years at one site and three years at the other. Our work has required monitoring egg laying in more than 300 boxes. We have individu-

ally marked more than 6,000 eggs and followed their fate—a task that has involved hundreds of hours slogging through chest-deep swamps, climbing trees, and peering into nest cavities.

The results of our efforts are clear: box proximity and visibility markedly affect the incidence of dump nesting. Across the years and at both study sites, at least 60 percent of the visible boxes contained dump nests, but only 34 percent of the well-hidden boxes were parasitized—roughly the same rate as in natural nests. In some visible boxes at least six different females (and probably more) laid eggs daily, but only one or two females typically contributed to any well-hidden box. In the visible boxes clutches were usually large (16 to 30 eggs), whereas the clutches in well-hidden boxes were smaller—11 to 14 eggs—well within the range of greatest hatchability. As a result, a significantly greater proportion of eggs hatched in well-hidden boxes compared to visible boxes (62 percent versus 49 percent, respectively). Among the visible boxes, the parasitism rate, mean clutch size, proportion of eggs that were wasted, and number of abandoned nests all increased with increasing population size, but such effects were not apparent among the well-hidden boxes regardless of population size.

The successes of our long-term experiments lead us to suggest that wood duck nest box programs should incorporate strategies for minimizing dump nesting, especially in areas where duck populations are high. More live ducklings can be produced from the same number of boxes—or indeed fewer—if they are hidden and unparasitized than if they are visible and heavily parasitized. Although wildlife management personnel have been understandably hesitant to change long-standing practices, there have been some encouraging signs recently. Several tests of our hypotheses at other sites have yielded supportive results. And the most recent technical publications caution managers to carefully consider nest box placement in light of the accumulating evidence.

What can individuals do? If you are just starting a wood duck nest box program, you may wish to erect nest boxes in visible locations to attract the birds initially. To minimize dump nesting, however, the boxes should eventually be repositioned at lower densities and in locations that mimic the natural cavities where the birds evolved to nest. Even if your property doesn't include wood duck habitat, these simple suggestions are germane to other box-nesting species such as wrens, chickadees, and bluebirds.

We conclude our story with two messages. First, conservation and management programs must be developed in light of, rather than in spite of, the behavioral ecology of a species. In the case of wood duck clutch size, "more" does not necessarily equal "better." Second, if we want Gr-1, Gr-3, and their kind to behave like wood ducks and to maintain their populations near the environmental carrying capacity, we must protect the birds' natural habitat. Efforts to provide safe, well-placed nesting sites for wood ducks are futile if the ducklings do not have suitable areas in which to grow up and, later on, to nest. This means that preserving wetlands must be our top priority. ■

When nest boxes are clustered, naturally solitary female wood ducks can't slip into their nests unobserved (left). To promote normal behavior and minimize dump nesting, Sherman and Semel recommend mounting nest boxes in locations that mimic natural nest sites (far left).

Paul Sherman is a professor in the Section of Neurobiology and Behavior at Cornell University. In addition to wood ducks, he is studying the behavioral ecology of naked mole-rats and Idaho ground squirrels. Sherman recently wrote for Living Bird *about extra-pair copulations (Summer 1990). Brad Semel is a certified wildlife biologist at the Max McGraw Wildlife Foundation in Dundee, Illinois. He is involved in numerous studies integrating theoretical behavioral ecology with applied wildlife management.*

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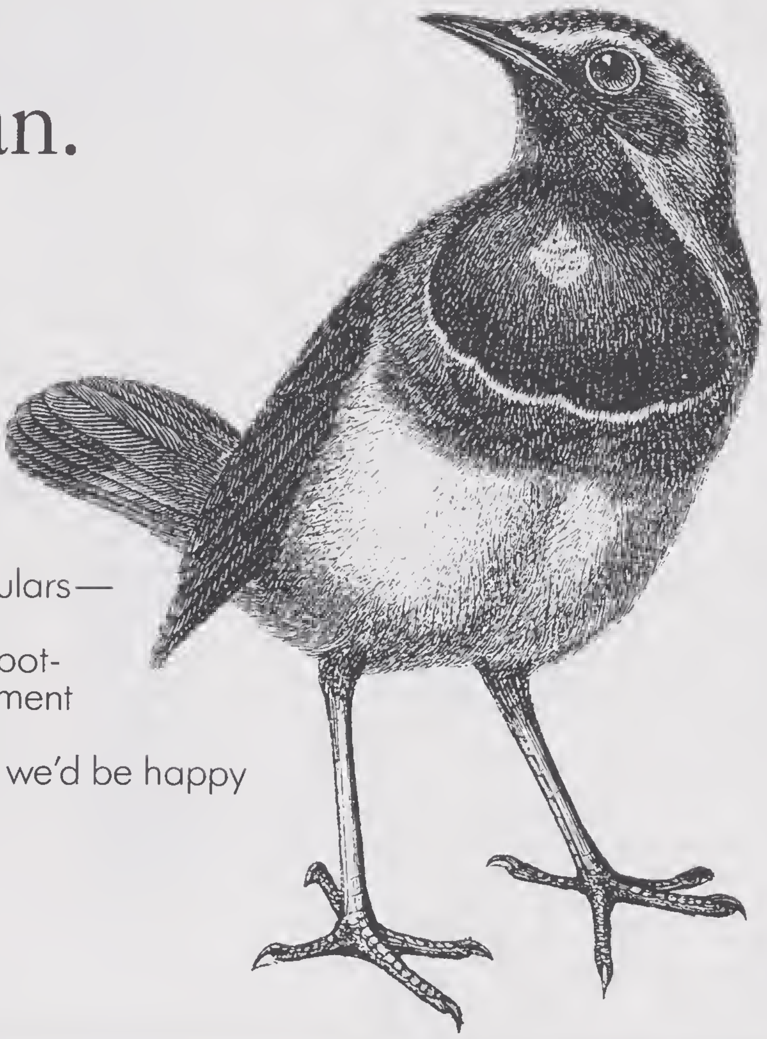

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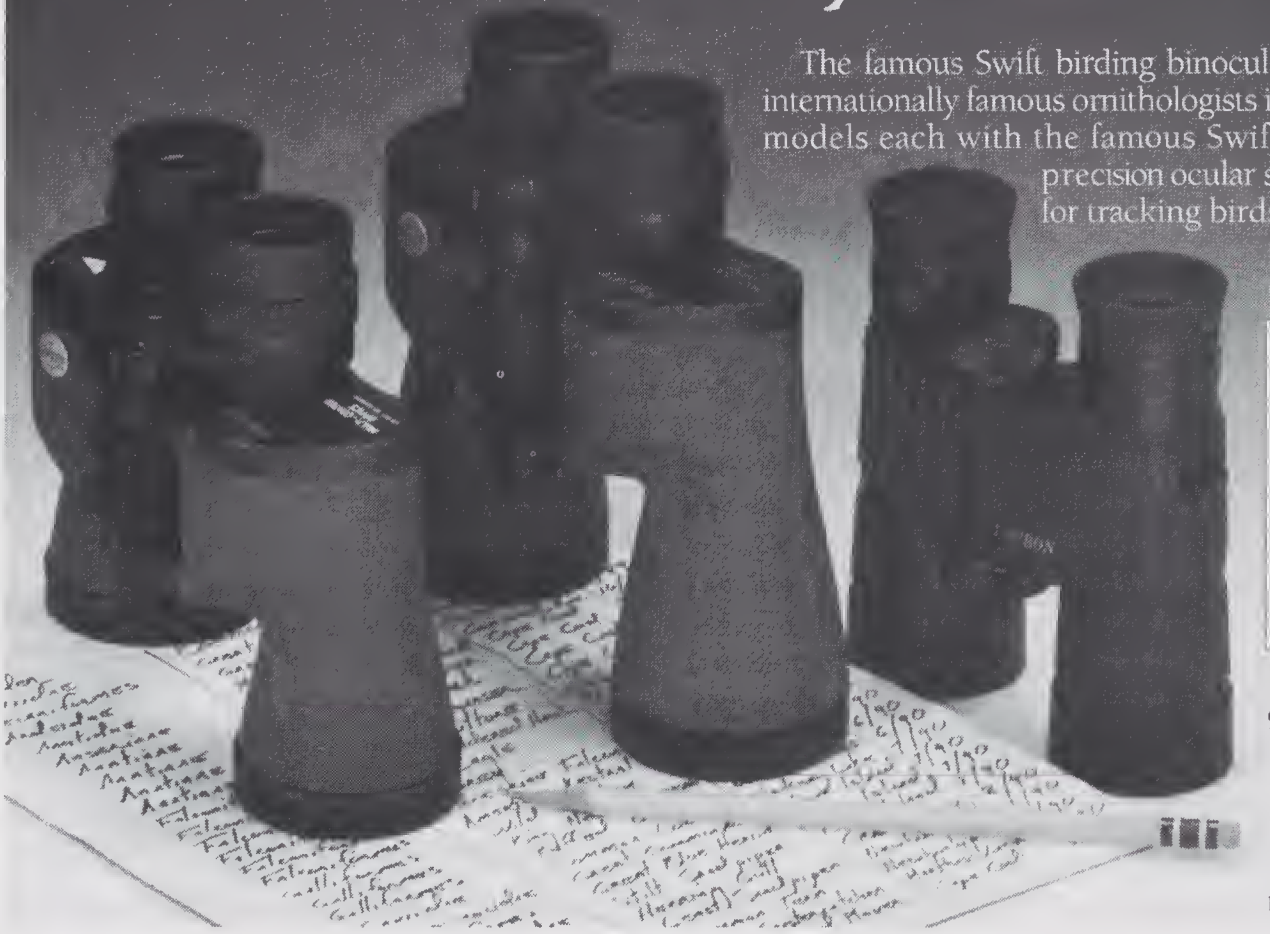


"BIRDERS WELCOME"

by Cynthia Berger

Sally Spofford's hospitality extends from Cornell to the Chiricahuas

If you tour the Lab of Ornithology at Sapsucker Woods, you'll see a bustling research center: gleaming banks of electronic equipment in the Library of Natural Sounds and the Bioacoustics Research Program, and humming computers in Bird Population Studies. You'll also enjoy the picturesque bird-feeding garden, and the Crow's Nest Birding shop. You might peek into the membership and business offices, with their jangling phones; perhaps you'll notice the ample staff library, and walk the well-groomed trails. As you complete your tour, you'll realize that these varied programs and facilities depend on a staff of nearly 60 people. And you might take it for granted that the way things are now is the way they've always been.

But turn back the calendar 35 years, to a snowy day in December 1956, when four ornithologists hauled boxes into a low stucco building, the walls still smelling of fresh paint. At last the Laboratory of Ornithology had a home of its own, after years spent moving from department to department on the Cornell University campus. Of the four people setting up their offices in the new building that happy day, two—Arthur A. Allen, Cornell's first professor of ornithology, and Peter Paul Kellogg, a pioneer in bird sound recording—were to share the directorship of the Lab. The third, William Dilger, was director of research. And the fourth person would handle, in Dilger's words, "everything else"—juggling most of the responsibilities that today, as the Lab has grown, occupy literally dozens of employees.

That single person was Sally Foresman Hoyt Spofford. Currently known for legendary hospitality at her Arizona ranch, where over 4,000 birders a year enjoy the dazzling display at her backyard feeders, she has also contributed to ornithological research through her banding studies and feeder observations. Most importantly for Lab staff and members, however, Sally Spofford holds a significant place in Lab history for her many accomplishments on behalf of the fledgling research center.

Sally's role at the Lab grew out of her long association with the ornithology department at Cornell. She initially came to the university in 1939 to pursue a Ph.D. in embryology. "I was always interested in birds when I was growing up," she says, "but in the twenties it wasn't a popular thing. I was discouraged from going into ornithology because it wasn't considered a field for women—I was urged to make it my hobby only." After taking a few classes from Allen, however, she switched her focus of study to ornithology.

Sally married fellow graduate student Southgate Hoyt in 1943. Soon after, their studies were disrupted by World War II. Hoyt served as a medic in military hospitals, and Sally worked alongside him as a civilian medical technician. After the war they returned to Cornell, and in 1948 completed their doctorates.

Their home in the nearby village of Etna, lovingly landscaped as a haven for birds, was also a popular gathering place for ornithology students. Bill Dilger, then a graduate student, remembers evenings spent playing "The Game," a version of charades in which players acted out different birds. "My, we had fun," Dilger says, laughing. "I don't think grad students do that kind of thing anymore."

Sadly, Southgate Hoyt died of cancer in 1951. Not long after, Sally began working a few days a week for Arthur Allen. Soon she was an integral part of the team of ornithologists that would launch the independent, membership-based Lab. "Arthur Allen and Paul Kellogg recognized my ability," she says modestly of her Ph.D. and experience. Sally had a hand in significant decisions that have shaped the focus and character of the Lab as it is today. In 1954, she helped Allen and Kellogg select the Lab's first Administrative Board; after the land was purchased for the Sapsucker Woods sanctuary, she and Allen walked the woods, laying out the trails.

"In 1956, when we moved in, I felt wonderful," Sally remembers. She had a

Cornell Lab of Ornithology Archives

Sally Hoyt Spofford steals a quiet moment in a busy day at the Lab during the 1950s.

desk in the observatory with its large windows overlooking the pond. Her day-to-day responsibilities were formidable: assisting in the production of the Lab's innovative bird sound records, greeting school and tour groups, organizing the Lab's already extensive slide collection, handling book, record, and print sales, and bookkeeping; often, she substituted for Dr. Allen on the Lab's Saturday morning radio program, "Know Your Birds." She coauthored two Lab birding guides, *Enjoying Birds Around New York City,* printed in 1966, and its 1968 sequel, *Enjoying Birds in Upstate New York.* Sally also lectured to garden clubs and other organizations, led bird walks, and assisted with Lab research projects.

In addition to her Lab responsibilities, Sally pursued her research interests. She kept the official lists of birds seen in Sapsucker Woods and the Cayuga Lake Basin. For more than 15 years, she served as regional editor for *The Kingbird,* published by the Federation of New York State Bird Clubs. Her list of publications in 1961 included papers in *The Auk,* the *New York State Conservationist, Audubon Field Notes, The Kingbird,* and *The Wilson Bulletin.*

And she banded birds. "When the evening grosbeak first turned up in the East," Sally says, "I was involved in a project led by Dr. Benjamin Shaw of Northampton, Massachusetts. We'd color mark the birds and see where they went. I was also involved in another study, tracking tree sparrows for longevity and attachment to a winter home."

When the Lab began its popular Monday night seminars Sally, with her customary hospitality, would invite everyone to her house for cookies and conversation afterwards. "There was a group of birders from Syracuse that always came down," she confides. "That's how I met my husband, Walter Spofford." Sally married Spofford, a Syracuse neurosurgeon and authority on the golden eagle, in 1964.

Sally continued to work at the Lab after her marriage. But a new chapter in her career was soon to open. On a vacation, Sally and Walter visited the Cave Creek Canyon area of the Chiricahua Mountains in southeastern Arizona, and when Sally retired from the Lab in 1969, the Spoffords began to think seriously about settling there.

JOHN EMLEN

Sally and Walter Spofford at Rancho-Águila in Arizona.

In 1972 they moved to a little ranch in Portal, Arizona, where they still reside today. "We came here because it was so outstanding," says Sally, "*all* the wildlife, not just the birds." The Spoffords named their 13-acre property Rancho-Águila, "Ranch of the Eagle." They did some landscaping—brushpiles, fruit-bearing shrubs, birdbaths—and hung out over 30 feeders. As a result, Sally and Walter attract more than 200 different species to their yard.

The Spoffords brought to Portal not only their habit of providing for birdlife but also their open-door policy for birders. A sign on the ranch gate reads "Birders Welcome," and by word of mouth the reputation of Rancho-Águila has spread, so that Sally's feeders are a "must-see" for birders. "When the AOU [American Ornithologists' Union] met in Tempe six years ago, I think they *all* came out here," says Sally. Guests at the ranch are free to wander the property; the Spoffords leave lawn chairs handy so folks can sit and watch the show in comfort. Always attentive to detail, Sally also sets out checklists and other bird information.

Sally passes on the heritage of her ornithological training to her visitors. Birder Kenn Kaufman, author of the *Peterson Guide to Advanced Birding,* recalls the time he told Sally that he'd spotted an American redstart up a canyon—an uncommon sighting, but not a rare one. "She made me sit right down and write it up, all the details, very correct. It was the first time anyone had pointed out to me the importance of such records. Sally impresses this perspective on the birders who visit the ranch. It's largely thanks to her that we have such a good record of the birdlife of Arizona."

"Sally's like that," agrees ace birder Pete Dunne. "She doesn't hang feeders just to have some pretty birds around. She watches what happens very carefully. Someone else might notice an uncommon species and mention it to a friend or two. Sally publishes a note—she makes sure it goes into the scientific record."

Recently, the Spoffords made sure that Rancho-Águila's wildlife will be enjoyed by birders and others for generations to come. Their property is now part of The Nature Conservancy's Portal Preserve. Their Etna property, donated to the Finger Lakes Land Trust, is also now protected in perpetuity. For all that Sally Spofford has done for the Lab and ornithology, we—and the birds—are grateful. ■

DO IT YOURSELF

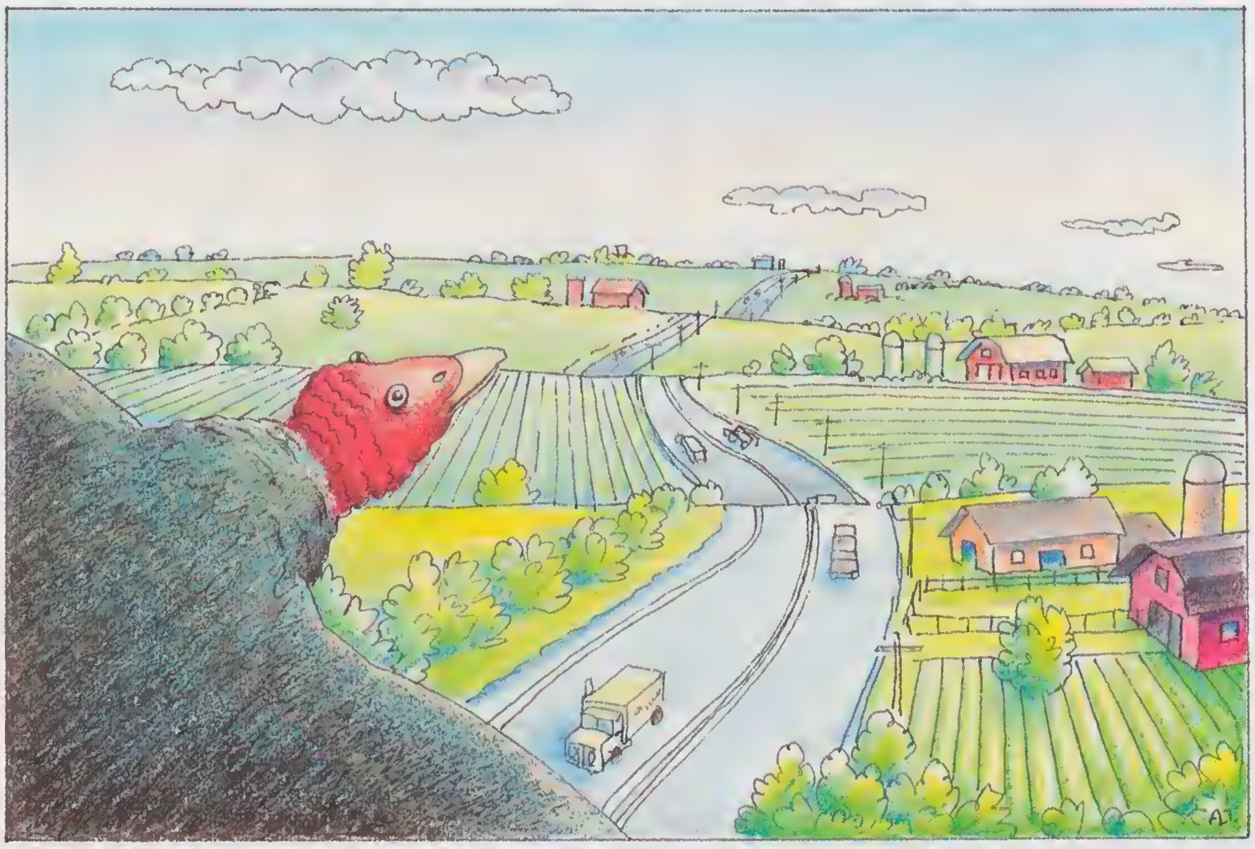
by Richard E. Bonney, Jr.

An independent research project can bring some surprising rewards

Fourteen years have passed since my days studying birds in the North Woods, but every time I uncap a bottle of fly dope I can hear them singing. Solitary vireos, whistling their *cheerios* from the treetops. Swainson's thrushes, wheedling their ascending gurgles from the understory. Winter wrens, yodeling their impossible symphonies from various tangles of brush. And the ovenbirds, so many ovenbirds: the woods resounded with their *creature, creature, creature!* The memories are so sweet I can almost forget the swarming blackflies, piranhas of the air.

I was a research assistant at Dartmouth College in those days, with a recent B. S. from Cornell. My study plot lay in the Hubbard Brook Experimental Forest in New Hampshire's White Mountains; my task was to help professor Richard Holmes analyze the foraging ecology of the area's breeding birds. Our goal: to determine whether different species were feeding in measurably different ways. Many studies had suggested that food is a limiting resource on the breeding ground; if this were true, we reasoned, then various bird species might feed in different locations, or employ differing foraging techniques, to avoid competing for the exact same insects.

After my first summer in the field, preliminary data analyses suggested that our hypothesis was correct. Most species of Hubbard Brook birds fed on different kinds of trees, or in different parts of trees, or used different feeding tactics as they searched for prey. Two species, however, exhibited foraging behavior that seemed to overlap to a tremendous degree: the blackburnian and black-throated green warblers. This finding meant one of two things: either the birds were dividing the food resource in a manner that our study was not measuring, or they weren't dividing the resource at all.



Can turkey vultures smell their way to food? Find out for yourself.

ILLUSTRATION BY ANTHONY TABER

I was intrigued. A detailed investigation of these two species seemed like a perfect project for the next summer, so I wrote a grant proposal to the Undergraduate Research Program of the National Science Foundation. Happily the Foundation agreed, and the next May we hired Judy Burrill, an undergraduate from the University of Massachusetts, to try to solve our mystery. None of us had ever met Judy, nor had she ever studied birds, but she came with excellent references and seemed eager to learn.

Her job was a tough one. First of all, she had to master ornithological field procedures. Second, she had to trek two miles in the dark to reach the ridgetop study area by dawn, when the birds were most active. Third, the warblers' habitat was a tangle of brush and stunted trees that tore viciously at the hapless victim required to navigate it with binoculars and clipboard.

Yet Judy persisted doggedly, and by summer's end, she had made an interesting discovery. The two warbler species did feed in a very similar manner, and their territories did overlap heavily. However, every blackburnian warbler centered its territory around one or a few coniferous trees, primarily spruces, while the black-throated greens did not.

Besides its theoretical interest, this finding had implications for conservation. Imagine, for example, that all the conifers in the forest were removed in a logging operation. What would happen to the blackburnian warblers?

At the end of the season Judy spelled out her findings in a detailed report to the National Science Foundation. Later, some of her data were incorporated into papers published in scientific journals by the Hubbard Brook research team. And yet, as I've pointed out, when Judy began the project she had no experience studying birds. What she did have was an interesting question, patience, and the determination to find an answer.

Now, these 14 years later, neither Judy nor I are engaged in bird research. After graduating from college she married one of the Hubbard Brook researchers and switched her career to social work, while I also got married and left ecological research for a life of writing and editing. Still, because I watch birds constantly, dozens of intriguing questions about their ecology and behavior continue to present themselves.

For example, both eastern phoebes and barn swallows nest around my house, sometimes on the front porch, sometimes in the shed. Never, however, have both species bred during the same summer. Considering that both the phoebe and the swallow build mud nests in protected places, and that both feed on flying insects, do the two species somehow exclude each other to avoid competition? It would be interesting to place nesting platforms in many locations around my house to see if I can attract both species at the same time. It would also be fun to survey the porches and outbuildings at nearby homes to learn whether the same exclusion seems to be happening elsewhere.

My yard is also home to breeding red-winged blackbirds, which build their nests in the cattails at the edge of my pond. During the six summers I've owned the house, the cattails have increased in number, and so have the blackbird nests—from one to two to three. This fall I pulled out two-thirds of the cattails—I like the red-wings, but I also like to swim. Next summer, I predict that the pond will again host just one nest. If so, will additional red-wings nest in the nearby fields? I'm looking forward to next April when I can find out.

Many such questions could be asked. If you watch birds yourself, you've probably thought of some already. So here's a challenge: why not look for some answers?

At the least, you'll give yourself something to think about during your next slumberless night. At the most, you might discover something worth publishing, perhaps in your bird club newsletter or even your state ornithological journal.

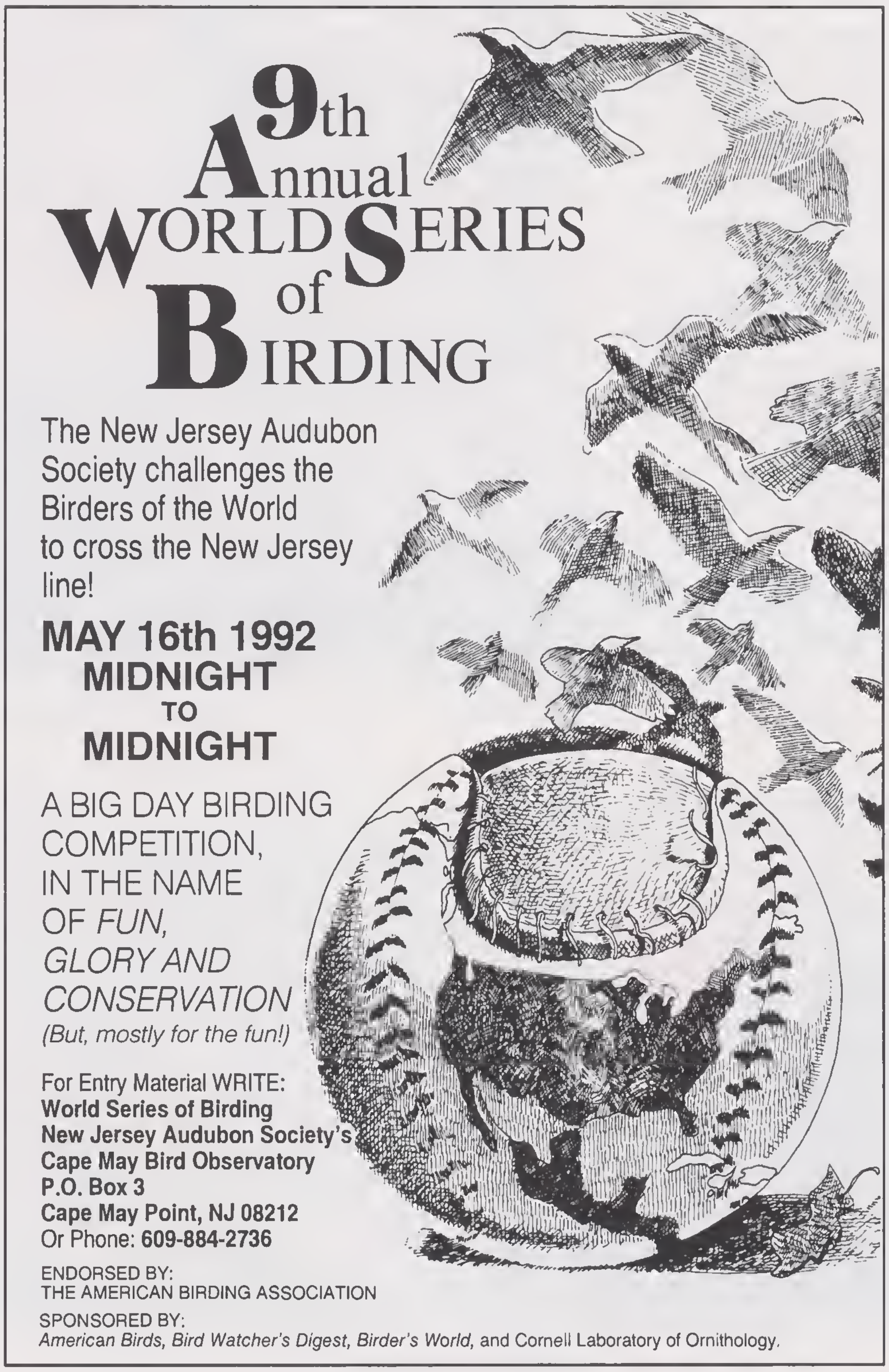
Sound far-fetched? Consider the summer 1991 issue of *The Loon*, the magazine of the Minnesota Ornithologists' Union. While thumbing through it this morning I came across an engaging article, complete with photographs, called "The Yellow Rails of McGregor Marsh." It describes the best breeding season ever for yellow rails in this world-famous marsh and provides the first-ever information on the incubation period for this elusive species (19 days for the family photographed). It was written by Warren Nelson, a professional accountant who studies and photographs birds as an avocation.

Having trouble getting started? Let me suggest an excellent book: *Beyond Birding: Field Projects for Inquisitive Birders* by Thomas C. Grubb, Jr. (Pacific Grove: Boxwood Press, 1986). This book is a treasure house of 20 ornithological investigations that an amateur can undertake at home. A couple of my favorites include "When Do Great Blue Herons Give Up?" which involves determining the length of time that a heron will watch unsuccessfully for fish, and "Can Turkey Vultures Smell Their Way to Food?" which involves hiding ripe and unripe road kills under bushes.

All of Grubb's suggested projects include sample data forms as well as information you can use to subject your data to simple statistical analyses. But don't be scared by that; the book is straightforward and easy to use, and would be great for starting scouts, nature clubs, and after-school groups on the road to meaningful scientific investigations.

Of course, if you're innovative, you can forgo the cookbook approach and come up with an idea of your own. And who knows? It might change your life. Remember when I mentioned that Judy Burrill married one of the Hubbard Brook researchers?

It was me. ■



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Critics' Corner

KNOW YOUR BIRD SOUNDS

VOL. 1: YARD, GARDEN, AND CITY BIRDS

VOL. 2: BIRDS OF THE COUNTRYSIDE

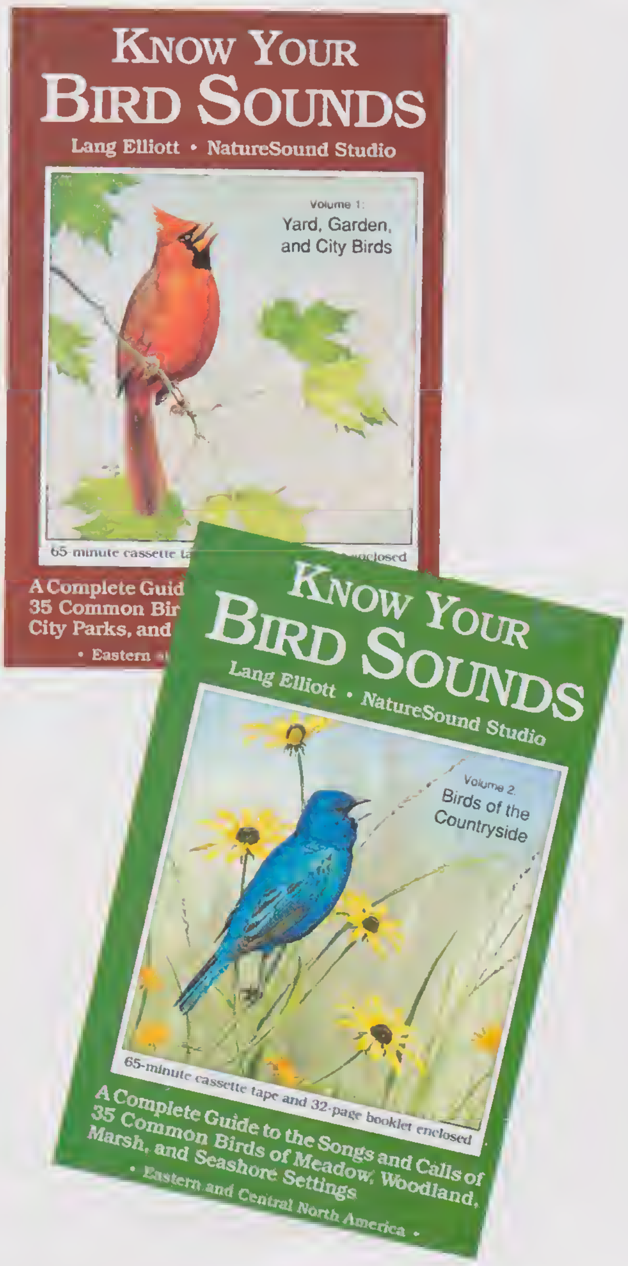
Produced by Lang Elliott,
NatureSound Studio, Ithaca, New York

Lang Elliott of NatureSound Studio is trying something new with these two recordings, and the result is a pair of tapes that may change the way we attend to bird vocalizations in the field.

Most bird sound recordings are designed to help the listener learn to identify birds by their voices, and inevitably these recordings emphasize bird *songs*. Elliott's intent is grander: to document and demonstrate the many other ways that birds communicate. Though songs are featured on both tapes, Elliott has an almost nonchalant attitude toward the sweet music. "The functions of songs are not discussed for each bird because they are basically the same for all species," he writes in the booklets that accompany the tapes. "Calls actually reveal more about the intimate lives of birds." This is a very different approach from the majority of tapes available.

Elliott has limited his selection of species (35 on each 65-minute tape, 70 species in all) so that he can provide extensive samples of the sound repertory of each species. Both of the "Know Your Bird Sounds" tapes include 150 different kinds of sounds, nearly five per species. Thus you'll hear six vocalizations for the robin (its familiar *cheerily, cheerup, cheerio, cheerily* song plus five different kinds of calls), six vocalizations for the dark-eyed junco, five for the white-breasted nuthatch, four for the spotted sandpiper, six for the barred owl, and so on. In addition, Elliott generally notes the behavioral situation that most often evokes each sound. In short, he gives us a new view of the breadth and complexity of bird vocabularies.

The six-page essay that begins both booklets is a lucid, concise, and helpful overview of our current understanding of bird vocalizations. The rest of each booklet names and describes all the sounds included on each tape and, even better, details their significance. We learn that the "high chatter" vocalization of the black-capped chickadee is "a high-pitched series of rapidly delivered notes sounding like *chippychipchippychip* [that] is often given by a dominant chickadee after he displaces another from a feeder or other food source." The calls of common loons, Elliott teaches us, can be divided into five kinds—and each is used in different circumstances. Did you know that fledgling rose-breasted grosbeaks "bring attention to themselves with a burry, down-slurred whistle: *teeyoo*"? Or that the male tree swallow often bows to his mate while he sings his "short song"? Have you ever heard a female red-winged blackbird answer her mate with her "sputter" call?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I say these tapes may change how we attend to the sounds of birds because I believe that birders will be inspired by them to go out into the field and hear vocalizations most of us have never noticed before. Thanks to Elliott's enlightening tape, for example, I am determined not to walk away from the next scarlet tanager I identify by song (or that familiar *chick-bree* call) but instead to listen for the species' *sweet* call: "An intimate [and] soft, melodic whistle [that] seems to be a contact call used primarily by mates; it can only be heard from several yards away."

Elliott's narrative voice is a large presence on both tapes. My one curmudgeonly comment is that he seems to be trying so hard to speak in a friendly tone that he has drawn more attention to himself than he might have—like the thief caught by the police because he disguised himself in a Santa Claus outfit.

Should you buy these tapes? A beginner attempting to learn sound identification would be better off buying Richard Walton's "Birding By Ear" tapes first because more species are covered, sound-alikes are compared and contrasted, and identification is emphasized. If, however, you already know songs well and want to move toward a deeper understanding of bird communication, "Know Your Bird Sounds" Vols. 1 & 2 are two tapes you *must* have. As far as I know, no other similar commercially available recordings exist, and I am hoping they sell like hotcakes, so Elliott will be inspired to push on to give us recordings of other species in this same mind-opening mode. Can you imagine a dictionary of North American bird sounds? These two tapes are chapters one and two.

—Jack Connor

"Know Your Bird Sounds" tapes are distributed by Chelsea Green Publishing Co., Rt. 113, P.O. Box 130, Post Mills, Vermont 05058-0130. 1-800-639-4099. $12.95 each.

The Catbird Seat

IT MUST BE LOVE

by Pete Dunne

He was the only figure at the bar, a man in his early forties wearing an Explorer's Inn T-shirt and binoculars slung bandolier fashion under an arm. He raised a glass to his mouth and tipped it back, stopping the ice cubes with his teeth. The glass was empty.

"Not a happy man," thought the bartender. "A political exile perhaps. Or more likely a man coming to grips with a love gone bad."

"Another, sir?" the bartender invited.

"One more," the solitary figure agreed, forgetting that he'd said the same thing last time. The drink arrived and the patron grasped it with both hands, but he did not drink it right away. He merely stared down at the discolored contents of the glass.

Yes. Once he had been a happy man. A birder (and this is the happiest thing that a person could ever hope to be). Once he had wasted whole, wonderful, weekends wandering through woodlands, watching whatever came his way.

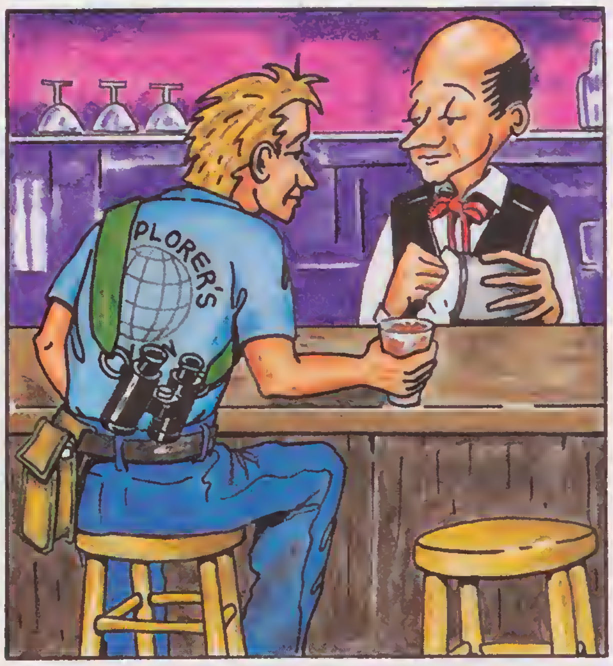
"I'm a damn good birder," he thought to himself. And it was true. But those happy, carefree days were gone. Yes, gone, half a lifetime ago. Lost to an age when the fifth American redstart of the day still brought smiles, and a rumbling tummy didn't stop a day's birding (because there was only one tummy to rumble, his, so it didn't really matter).

"Back before I became a field trip leader," he thought, raising the glass and draining it. He didn't even notice when the bartender replaced his empty glass with a full one.

"It happened before I knew it," he thought, and this, too, was true. There he had been, just a shy, quiet person who liked to watch birds; just one of the happy, tag-along members of the local birding club on Saturday field trips.

Then he started beating club leaders to calls. He began finding saw-whet owls on Christmas Bird Counts, reading off five minutes' worth of local sightings at every bird club meeting, and getting his initials plastered all over the regional accounts in *American Birds*—sometimes even his whole name!

And then came that fateful day when he showed up for a scheduled field trip and the club's venerable field trip leader did not! And nobody knew what to do. And then everyone turned to him, the bright new star.



The next thing he knew, he—a quiet, shy person—was at the head of a line of 20 people, every one of them depending on him to know which way to turn at trail junctions, how to tell the difference between blackpoll and bay-breasted warblers, when to call a pit stop.

Suddenly, he was the one who had to make sure everyone got on the bird, had to shush people for being too noisy, had to act aloof and confident (when all he really wanted to do was just watch birds and have fun).

He didn't blow a call all day . . . and it really wasn't fair to take him to task for being several hours late getting to the rest rooms. After all, he was still too young to drink coffee. And after he'd found the black-billed cuckoo, everyone forgot about his strategic indiscretion.

Well, almost everyone.

After the trip, (almost) everyone said "thank you" and "good job." Soon he was just a little less shy and he was leading one-day field trips every weekend. Then he began organizing holiday weekend road trips. Then he was planning and leading club tours to places like Southeast Arizona and the Rio Grande Valley.

And then one day the director of a big national bird tour group called to ask whether he might help on a tour that would include local hotspots. For pay! And he'd snapped at the chance. Gone for it like a young kingbird goes for a passing monarch butterfly.

"And I was hooked," he said aloud to his glass.

"That was many years ago," he thought. "Many years and many tours and many hundreds of tour participants."

Now he was a professional bird tour leader; a person whose job it is to find exotic birds and make people happy. His days were long, filled with big decisions and tiny birds that never sit long enough on a branch. His nights were spent checking airline reservations, arranging for local guides, ordering box lunches—some with, some without, mayonnaise/luncheon meat/pork products/cucumbers/MSG—and staring at the ceiling of his motel room, wondering whether to try for the lammergeier again tomorrow or just blow it off and head directly for the Mara.

He sighed deeply.

"Another drink, Bwana?" the bartender coaxed.

"No, thank you," the leader said, glancing at his watch, then draining his glass. He paid the check and headed for the door, the taste of sugar-beet sweetened Coke still thick in his mouth.

"It must be love," the bartender thought, sadly. He was very close to being right. ■

ILLUSTRATION BY JEFF SIPPLE

CLARK'S GREBE BY TIM GALLAGHER

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For the Study and Conservation of Birds

TIM GALLAGHER

Big BirdWatch '92 is Coming!

. . . and the Sapsuckers will be migrating to New Jersey

Watch your mailbox
for details

BIRDSCOPE

The newsletter of the Cornell Laboratory of Ornithology ■ *Volume 6, Number 2* ■ *Spring 1992*

Project Aves Takes Flight!

Teachers from 10 New York State elementary schools met at Cornell's Arnot Teaching and Research Forest in Cayuta, New York, last October to launch a new, multidisciplinary curriculum. Called "Project Aves: Investigating and Writing about Birds," the elementary school curriculum is the result of a collaboration between the Cornell Lab of Ornithology and the Roger Tory Peterson Institute (RTPI). This winter, teachers participating in the pilot project are using specially designed bird feeders—and the birds that visit them—as the focus for lessons in science, math, writing, art, and geography.

At the heart of Project Aves is a hands-on science experiment. Students, mostly fourth-, fifth-, and sixth-graders, will conduct a bird-food preference study outside their classroom windows to determine whether feeder birds in their regions, which include Ithaca, Jamestown, the Adirondacks, Rochester, and Long Island, prefer safflower seed or black-oil sunflower seed. The answer to this question is unknown, so the results will be of scientific interest. They will also be important to the marketing efforts of birdseed companies.

The participating teachers left the Arnot Forest excited about the project. They toted away bird feeders custom designed and donated by Duncraft, Inc., sacks of sunflower and safflower seed donated by Agway Country Foods, Inc., field guides donated by Houghton Mifflin Company, and a variety of other instructional materials provided by the Lab and RTPI.

TIM GALLAGHER

Hands-on science is just one part of Project Aves.

Bird feeders have been up outside classroom windows since November and students have been learning to identify birds. From starlings to rufous-sided towhees, birds are being observed and recorded. "Everyone is enthusiastic about the project—superintendents, principals, teachers, and especially students," says Lab education specialist Todd Culver. "Some kids have really been turned on by Project Aves already. Even children who haven't been successful in school love this type of learning and some have put up feeders at home," says Culver.

Culver and Bill Sharp, director of education at RTPI, are visiting the pilot schools to connect them to a computer network that will allow students to share information and ideas about the bird project. In February, students began to collect data for the feeder preference study and report their results to ornithologists at Cornell using The Link, a computer bulletin board service provided by PBS affiliate WCFE in Plattsburgh, New York.

Students are also writing and sketching the birds that visit. Some have started "nature journals," combination personal diaries, sketch books, and field notebooks. Others use word processors to write short stories about the birds they've seen.

"So far the program has been remarkably successful," says Culver. "We are seeking funds to expand Project Aves into a series of hands-on science experiments focusing on birds. In the future we hope to link elementary schools together across North America, and maybe even Mexico and Central America."

Bird Population Studies to Add Endowed Chair

We're pleased to announce that the Lab's Bird Population Studies program will soon be enhanced by the addition of an endowed professor, the Edwin H. Morgens Professor of Ornithology. This important gift has been made by two generous Lab members, Howard and Anne Morgens, in honor of their son.

This is the Lab's first endowed professorship, and it is a position that will significantly strengthen our prominence in bird research, education, and environmental conservation. We're especially pleased that the chair is named for Edwin Morgens, chairman of the Lab's Administrative Board, who has played a major role in planning the future at Sapsucker Woods.

This milestone endowment gives a great boost to our new capital campaign. In addition, we hope to fund two more professorships, raise funds for an operations endowment, and provide support for a larger visitors' center and office space for staff. Our goal—$9 million—is part of universitywide campaign at Cornell to raise $1.25 billion over the next five years.

We are close to finalizing an endowment for the second professorship, and we already have several commitments toward the third. These two additional endowments will cover the executive director and the director of our Library of Natural Sounds.

These are exciting times for us. We'll keep you posted on our capital campaign progress.

Scott Sutcliffe

Scott Sutcliffe, General Director

BOB BROWER

Profile: Greg Budney

Greg Budney takes his superpowered, 20-pound Nagra tape recorder everywhere. "Even on my honeymoon," admits the curator of the Lab's Library of Natural Sounds. "I got some great recordings of a sharp-shinned hawk."

How did Greg develop his passion for perfect recordings? It all started with a phone call.

"When I graduated from SUNY Geneseo in 1979 with a B.S. in biology, I applied for a job at the Lab of Ornithology. Although I didn't know it, the personnel office at Cornell lost all my paperwork, and my resume never made it to the Lab. But when I innocently called Jim Gulledge [then LNS curator] to check on the status of my application, he asked me to come in for an interview anyway. Driving home that day, someone smashed into my car. So there I was: unemployed, penniless, my car a wreck. Luckily, I got the job!

"I started as a curatorial technician: cutting, splicing, and copying tapes, entering data into the computer, proofreading the entries—the basic jobs that keep the LNS collection organized. At the time I thought it was kind of boring, frankly."

But things changed for Greg in 1981 when the assistant curator left and Jim Gulledge gave the new technician the opportunity to take over that position. "Soon I began working directly with Ted Parker [ornithologist from Louisiana State University and neotropical bird sound recordist extraordinaire]. In those days, field recordists who contributed sounds to the LNS collection got very little help or supervision using our studio equipment to make copies of their tapes, so the copies were often poorly made. Ted and I started developing techniques to improve the quality of the copies. In the process, I learned how to listen to sounds—to *really* hear for the first time.

"I began doing my own recording in 1983. I learned a lot on my own—no one at the Lab was doing any recording, we just accepted tapes from field recordists. I didn't have my own equipment then, and it was a scramble to find usable stuff at the Lab—most of it was out on loan.

"1985 was the real turning point for me. Ted invited me to Peru for a three-week expedition. We made the first-ever recording at close quarters of a nocturnal curassow. Few non-natives had ever seen the bird, much less recorded it. I felt, for the first time, that I'd made a really significant contribution to ornithology in the neotropics. I was hooked.

"I also developed a whole new appreciation for the routine work back at the library. Cutting and splicing and data entry—now it all made sense. I could see how important it was. Later that year, I taught my first sound recording workshop for the Lab, in Machias, Maine. It was really satisfying—I'd taught myself to record, now I could teach others. In 1986, I bought my own Nagra."

Greg was promoted to curator of LNS in March 1989, soon after Jim Gulledge retired. He runs a tight ship, and the LNS staff is a close-knit, dedicated group. Says Greg, "It's exciting to see the place develop. With our move to the new facility in 1990, we've made some substantial changes in the way the library is run and how we serve the folks who use it. Our archival practices are more rigorous; we're seeing more graduate students take our workshops; and thanks to sound engineer Bob Grotke our equipment operates at a very high level of performance."

What does Greg see for LNS in the years ahead? "I think the LNS collection will have a growing role in conservation efforts. Scientists who conduct biodiversity surveys have demonstrated that recorded sounds are an invaluable tool—identifying birds and other animals by the sounds they make is a tremendously effective censusing technique."

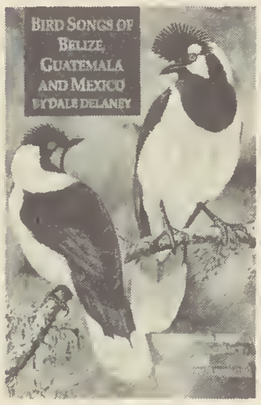
We asked Greg what three sounds he'd most like to bag for the LNS collection. His answer was a characteristic blend of ingenuous enthusiasm and scientific practicality. "An Eskimo curlew, I think, and also a Spix's macaw—there's just one left in the wild. Oh, and another recording of the nocturnal curassow. I have two good recordings now . . . three would make a better sample size." —*C.B.*

News from LNS

The Library of Natural Sounds is involved in several new sound productions:

Voices of the Cloudforest, a stereophonic chorus from Costa Rica's Monteverde cloud forest, from predawn till dark, put together by Lab associate Dave Ross.

Birds of Ecuador by Peter English and Lab board member Ted Parker. This tape, covering about 100 species, is being sponsored by Victor Emanuel Nature Tours. Proceeds from tape sales will benefit CECIA, an Ecuadorian ornithological foundation and conservation association.



Bird Songs of Belize, Guatemala and Mexico, by Lab associate and Victor Emanuel Nature Tours guide Dale Delaney. This tape covers 70 species—rarities, regional endemics, and distinctive subspecies.

A tape on **Neotropical parrots** by Ted Parker and Greg Budney. This tape is intended for use by researchers and conservation associations working in the neotropics.

A **Hawaiian bird sounds** tape, compiled by Lab associate Doug Pratt, which will be used for censusing work by the U.S. Fish and Wildlife Service and the Hawaiian Department of Conservation.

For each of the above productions, LNS creates the master tape, provides technical consultation, and is the sole manufacturer.

LNS is pleased to report that two grants have been renewed recently: one from the Natural Heritage Trust in New York State, and, with Syracuse University, a grant renewal from New York State Libraries for acetate-based tape recording preservation.

Times Mirror Magazines, Inc., was inadvertantly omitted from our list of corporate sponsors in the 1990/91 Annual Report. We apologize for the error.

Staff Activities

Bill Langbauer spoke at the 13th Annual Elephant Managers Workshop, held in October 1991 in Syracuse, New York, on infrasonic communication in elephants. In November, at the Northeast Regional Animal Behavior Conference in Amherst, Massachusetts, he presented a poster titled "Vocalizations and Movements of Free-ranging African Elephants" with colleagues **Katy Payne, Russ Charif**, and Rowan Martin. Langbauer also spoke on elephant vocalizations at a meeting of the American Zoological Society in Atlanta, Georgia, in December, and at the Winter Animal Behavior Conference in Jackson Hole, Wyoming, in January 1992.

Bioacoustics Research Program Director **Christopher W. Clark** traveled to Chicago in December for the 9th biennial meeting of the Marine Mammal Society, at which he chaired a symposium on marine mammal communication. Last fall, Clark taught a new graduate bioscience course at Cornell University, "Sound Transmission in Deciduous Forests."

Lab director **Charles Walcott** has been elected a Scientific Fellow of the New York Zoological Society. Fellows provide scientific counsel and services to the Society, and serve a three-year term.

At the second annual meeting of Partners in Flight/The Neotropical Migratory Bird Conservation Program, held in October in Madison, Wisconsin, **Charles Smith** was elected to a two-year term as chairman of the Northeast Working Group and also gave a talk, "Building Partnerships for Bird Conservation: Some Examples from New York State." Later in October, Smith traveled to Saint Lawrence University in Canton, New York, as a Pew Visiting Scholar, to give a talk, "Conservation of Birds in Landscapes Dominated by Humans." Smith was an invited speaker at a November workshop sponsored by the U.S. Forest Service and U.S. Fish and Wildlife Service, and that month also gave a talk, "Partners in Conservation of Birds on Public Lands" at the New York State Department of Environmental Conservation in Albany, New York.

Wings of the Wild, the official publication of the Southern States Wild Bird Lovers' Club, is a new bird-feeding newsletter that Southern States Cooperative is producing in cooperation with the Lab. The four-page, bimonthly publication will include helpful information about attracting and observing birds along with discount coupons for Southern States bird food and bird-feeding products. *Wings of the Wild* is edited by **Rick Bonney**, director of education and information services. The Lab receives a contribution for every new club member. Southern States operates stores in North Carolina, Kentucky, Maryland, Delaware, Virginia, and West Virginia. To join the Bird Lover's Club, call 800-822-6577.

Lab Newsletter Index Available

An index of the Cornell Laboratory of Ornithology newsletters, Numbers 1 through 95, has been compiled by Sally Spofford, former administrative assistant to the director at the Cornell Lab of Ornithology. The Lab newsletters began publication in 1956, when the Lab was designated an official Cornell department, and ceased in 1981 with the first issue of *The Living Bird Quarterly.* Copies of the 47-page index are available for a $5.00 photocopying and shipping charge. Write: EIS, Cornell Lab of Ornithology, 159 Sapsucker Woods Road, Ithaca, NY 14850.

Big BirdWatch 1992

It's springtime in New Jersey and the Lab's resident big day team is already gearing up for this year's Big BirdWatch, set for Saturday, May 16. Starting at midnight and continuing for 24 hours, our "Sapsuckers" and other birding teams from across North America will fight it out in the World Series of Birding, scouring the Garden State to find more bird species than anyone else.

The stakes are high. Besides the honor and glory of beating everyone else, the top team overall wins the coveted Urner-Stone Cup, while the best out-of-state team wins the Stearns Award. But the World Series of Birding is only part of the story. Big BirdWatch is a major fund-raising event for the Lab. Members and friends pledge a small donation for each species the Sapsuckers find. Last year's Big BirdWatch brought in over $30,000, which helped to sustain the Lab's vital programs in bird study.

We hope you'll join us this year and help to make Big BirdWatch 1992 a whopping success. Watch your mailbox in April for details.

Arrivals and Departures

Charles R. Smith, director of special projects and a longtime member of the Lab staff, has moved. In January, Charlie shifted his base of operations from the Lab of Ornithology at Sapsucker Woods to Cornell's Department of Natural Resources, where he will be able to share his expertise with a wider audience of students and fellow researchers. In his new position as adjunct associate professor, he will be teaching Cornell undergraduates and pursuing his own ornithology research interests.

Charlie joined the Lab in 1977 as assistant director. He was interim director of the Lab in 1979 and 1980, then became director of education and information services.

In January Lab staff also bid adieu to development coordinator **Ann Distefano**, who has moved to Redmond, Washington. We wish her well in future endeavors.

And we extend a warm welcome to our new development coordinator, **Tracey Newton-Clarke**. Tracey, who has seven years of experience in management, business develpment, and public relations, recently moved to the Ithaca area from Great Britain.

Tune in to BirdWatch

BirdWatch, the Lab's daily radio program, is now broadcast on over 100 stations nationwide. The 90-second show features fun facts, tips, the latest research, and great bird sounds from our own Library of Natural Sounds. Tune in today—check the listings below for the station nearest you that carries BirdWatch!

Cornell Lab of Ornithology BirdWatch Affiliates

State	City	Call letters	Frequency		Air time
ALABAMA	Florence	WBCF	1240	AM	10:50 A.M.
	Tuscaloosa	WUAL	91.5	FM	5:30 A.M.
ARIZONA	Flagstaff	KNAU	88.7	FM	6:30 A.M.
	Tucson	KGVY	1080	AM	6:15 A.M.
ARKANSAS	Harrison	KHOZ	900	AM	6:20 A.M.
	Jonesboro	KASU	91.9	FM	6:20 A.M.
CALIFORNIA	Bakersfield	KPRX	89.1	FM	7:35 A.M.
	Fresno	KVPR	89.3	FM	7:58 A.M.
	Monterey	KAZU	90.3	FM	8:15 A.M.
	Sacramento	KJAY	1430	AM	3:30 P.M.
COLORADO	Ignacio	KSUT	91.3	FM	9:00 A.M.
CONNECTICUT	Hartford	WHUS	91.7	FM	12:00 Noon
DELAWARE	Milford	WYUS	930	AM	7:45 A.M.
FLORIDA	Fort Myers	WWCL	1440	AM	9:15 A.M.
	Melbourne	WMMB	1240	AM	5:25 A.M.
	Orlando	WMFE	90.7	FM	5:00 A.M.
	Tampa	WGUL	860	AM	5:45 A.M.
GEORGIA	Folkston	WOKF	92.5	FM	12:15 P.M.
ILLINOIS	Carbondale	WSIU	91.9	FM	6:30 A.M.
	Chicago	WNIB	97.1	FM	6:15 A.M.
	Watseka	WGFA	1360	AM	10:35 A.M.
INDIANA	Gary	WAKE	1500	AM	7:26 A.M.
IOWA	Cedar Rapids	KMRY	1450	AM	8:40 A.M.
KENTUCKY	Bowling Green	WLBJ	1410	AM	8:10 A.M.
	Lexington	WLXG	1300	AM	7:35 A.M.
LOUISIANA	New Orleans	WWOZ	90.7	FM	6:01 A.M.
MAINE	Bangor	WMEH	90.9	FM	9:00 A.M.
	Calais	WMED	89.7	FM	9:00 A.M.
	Portland	WMEA	90.1	FM	9:00 A.M.
	Presque Isle	WMEM	106.1	FM	9:00 A.M.
	Waterville	WMEW	91.3	FM	9:00 A.M.
MARYLAND	Wilmington	WSER	1550	AM	6:17 A.M.
MASSACHUSETTS	Boston	WGBH	89.7	FM	9:00 A.M.
	Marlboro	WSRO	1470	AM	6:58 A.M.
	North Adams	WMNB	100.1	FM	11:00 A.M.
MICHIGAN	Alpena	WCML	91.7	FM	1:06 P.M.
	Flint	WFDF	910	AM	8:50 A.M.
	Mt. Pleasant	WCMU	89.5	FM	1:06 P.M.
	Lansing	WKAR	90.5	FM	8:06 A.M.
	Saginaw	WUCX	90.1	FM	1:06 P.M.
	Sault Ste. Marie	WCMZ	98.3	FM	1:06 P.M.
MISSOURI	St. Louis	WSIE	88.7	FM	5:00 A.M.
NEBRASKA	Omaha	KIWR	89.7	FM	12:00 Noon
NEW HAMPSHIRE	Rochester	WZNN	930	AM	6:50 A.M.
		WWEM	96.7	FM	6:50 A.M.
NEW MEXICO	Pine Hill	KTDB	89.5	FM	Varies
	Silver City	KNFT	950	AM	12:15 P.M.
NEW YORK	Albany	WAMC	90.3	FM	9:00 A.M.
	Buffalo	WEBR	970	AM	11:43 A.M.
	Canajoharie	WCAN	93.3	FM	9:00 A.M.
	Canandaigua	WLKA	102.3	FM	6:45 A.M.
		WCGR	1550	AM	8:25 A.M
	Elmira	WENY	1230	AM	4:50 P.M. and 5:50 P.M.
	Hornell	WLEA	1480	AM	9:40 A.M.
NEW YORK (cont.)	Ithaca	WHCU	870	AM	12:28 P.M.
	Jeffersonville	WJFF	90.5	FM	7:33 A.M.
	Kingston	WAMK	90.9	FM	9:00 A.M.
	Newburgh	WTBQ	1110	AM	7:15 A.M.
	Nassau	WLIM	1580	AM	6:51 P.M.
	Penn Yan	WYLF	850	AM	4:10 P.M.
	Rochester	WXXI	1370	AM	6:15 A.M.
			91.5	FM	6:15 A.M.
	Seneca Falls	WSFW	1110	AM	6:40 A.M.
	Ticonderoga	WANC	103.9	FM	9:00 A.M.
NORTH CAROLINA	Charlotte	WNSC	88.9	FM	8:30 A.M.
	Fayetteville	WFSS	89.1	FM	Varies
	Madison	WMYN	1420	AM	9:50 A.M.
	Greenville	WNOS	1450	AM	8:50 A.M.
	Rockingham	WAYN	900	AM	9:00 A.M. and 2 P.M.
NORTH DAKOTA	New Town	KMHA	91.3	FM	9:00 A.M.
OHIO	Cincinnati	WVXU	91.7	FM	2:30 P.M.
	Dover	WJER	1450	AM	12:30 P.M.
	Toledo	WSPD	1370	AM	1:53 P.M.
OKLAHOMA	Oklahoma City	KTOK	1000	AM	5:30 A.M.
	Tulsa	KCMA	92.1	FM	7:30 A.M.
OREGON	Albany	KOAC	550	AM	12:45 P.M.
	Bend	KOAB	91.3	FM	12:45 P.M.
	Grants Pass	KAJO	1270	AM	12:40 P.M.
	Pendleton	KRBM	90.9	FM	12:45 P.M.
	Portland	KOPB	91.5	FM	12:45 P.M.
PENNSYLVANIA	Bedford	WAYC	1600	AM	8:43 A.M.
	Clarion	WWCH	1300	AM	7:40 A.M.
	Kane	WLMI	103.9	FM	11:03 A.M.
	Lansford	WLSH	1410	AM	9:35 A.M.
	Pittsburgh	WDUQ	90.5	FM	7:58 A.M.
	Reading	WEEU	850	AM	9:45 A.M.
SOUTH CAROLINA	Aiken	WLJK	89.1	FM	8:30 A.M.
	Beaufort	WJWJ	89.9	FM	8:30 A.M.
	Charleston	WSCI	89.3	FM	8:30 A.M.
	Columbia	WLTR	91.3	FM	8:30 A.M.
	Conway	WHMC	90.1	FM	8:30 A.M.
	Greenville	WEPR	90.1	FM	8:30 A.M
	North Charleston	WJYQ	105.5	FM	9:00 A.M.
	Sumter	WRJA	88.1	FM	8:30 A.M.
SOUTH DAKOTA	Sturgis	KBHB	810	AM	3:15 P.M.
TENNESSEE	Chattanooga	WSMC	90.5	FM	4:08 P.M.
	Memphis	WREC	600	AM	8:45 A.M.
	Nashville	WPLN	90.3	FM	8:15 A.M.
TEXAS	El Paso	KTEP	88.5	FM	11:58 A.M.
	Galveston	KGBC	1540	AM	1:45 P.M.
	Houston	KPFT	90.1	FM	6:40 A.M.
UTAH	Salt Lake City	KHQN	1480	AM	12:15 P.M.
VIRGINIA	Norfolk	WHRO	89.5	FM	6:30 - 7:30 A. M.
	Yorktown	WYCS	91.5	FM	9:00 A.M.
WISCONSIN	Hayward	WOJB	88.9	FM	8:30 A.M.
	LaCrosse	WZFR	94.5	FM	7:00 A.M.
	Oshkosh	WHBY	1230	AM	5:45 A.M.

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JUN 3 0 1992
Shelf

LIVING BIRD

For the Study and Conservation of Birds

SUMMER 1992

JOE McDONALD

Will the wood thrush go the way of the passenger pigeon?

Migrant songbirds such as this wood thrush face overwhelming threats: massive deforestation on their wintering grounds in Latin America, habitat changes from global warming, and increased nest predation on their breeding grounds. Only the unceasing efforts of people dedicated to the well-being of birds can prevent their extinction.

At the Cornell Lab of Ornithology we are committed to bird conservation through bird population monitoring, research, and education. Our programs increase public awareness of the problems birds face *and* promote viable solutions.

Help us help the birds—Ask a friend to join the Lab today.

Your continued support makes our work on behalf of birds possible. But there is one more thing you can do . . . ask a friend to join the Lab. If every Lab member brought in just one new member, our effectiveness as a force for bird conservation would be doubled. Please give your friends the handy membership application cards inserted in this issue and encourage them to join today.

Cornell Laboratory of Ornithology
For the Study and Conservation of Birds

Laboratory Of Ornithology
159 Sapsucker Woods Road
Ithaca, New York 14850

JUN 30 1992

LIVING BIRD

A Publication of the
Cornell Laboratory of Ornithology

SUMMER 1992 VOLUME 11 NUMBER 3

10th Anniversary Issue

Greetings from Sapsucker Woods

This issue marks a milestone in the history of *Living Bird*—the beginning of our second decade of publication. The Lab of Ornithology launched Volume 1, Number 1 in the summer of 1982. Though the Lab had previously published an annual scholarly journal called *The Living Bird*, the new publication's attractive magazine format and quarterly publication schedule were changes intended to carry the Lab's mission of promoting the study, appreciation, and conservation of birds to a broader audience.

In the inaugural issue of the "*Quarterly*," Lab director Charles Walcott pledged to produce a magazine that would inform and excite readers, and also challenge them to become personally involved in the science of ornithology. "We are planning articles on virtually every aspect of bird study," said Walcott, "behavior, habitat studies, conservation, art, and the latest updates on ornithological research here and around the world."

Decade markers are a natural time to look back, take stock, and then determine which direction to go in the future. *Living Bird* is growing. What began as a 24-page publication is now 40 pages long, and we have plans of expanding still more. We will continue to bring you our unique blend of article topics, ranging from tough conservation issues and scientific study to reviews of the latest equipment and ways to enhance your birding enjoyment.

In keeping with our goal of promoting bird conservation through research and education, this issue of *Living Bird* focuses on a major environmental dilemma: the plight of neotropical migrants. The lead article, "Save Now or Pay Later," outlines the problems of habitat destruction here and abroad that threaten these birds, and also presents a list of actions we can take to help them.

As always, we welcome comments and suggestions from readers. It is only through your letters that we can determine whether we are on the right track with *Living Bird*.

— *Tim Gallagher, Editor*

Cover: *Less than two decades ago, the peregrine falcon seemed poised at the edge of extinction. Now peregrine numbers are up, but researchers continue to monitor the species at Padre Island, Texas, and other key migration areas. Story on page 14. Photograph by Tim Gallagher.*

Right: *Neotropical migrants such as this western tanager face unprecedented threats on both their breeding and wintering grounds. To find out what you can do to help them, see the article on page 8. Photograph by Art Wolfe.*

Back Cover: *This cattle egret is probably wondering why the photographer who snapped this picture is lying on a bed of oyster shells. Photograph by Larry B. Wales.*

Features

8 **Save Now or Pay Later**
by Greg Butcher and Rick Bonney
Now's the time for conservation action on behalf of migrant songbirds.

14 **The Peregrines of Padre Island**
by Tim Gallagher
Rare falcons gather by the hundreds each spring and fall at this vital migration staging area in the Gulf of Mexico.

21 **The Golden-cheek and the Ghost Subdivision**
by Mel White
An endangered species hangs on, deep in the heart of Texas.

24 **The Birds and the Damselflies**
by John Alcock
A familiar insect sheds new light on the mysteries of bird behavior.

Departments

4 **Letters**

5 **BirdNews**

Columns

6 **Spotlight** *by David S. Wilcove*
Eliminating protection for threatened subspecies like the Florida scrub jay would gut the Endangered Species Act.

30 **In the Field** *by Jack Connor*
The world needs more birders. Are you helping?

32 **My Turn** *by Herb Raffaele*
Are we guilty of scientific imperialism?

33 **Focus** *by Tim Gallagher*
Red-necked grebes; a nest portrait.

34 **Critics' Corner** *by Jeff Wells*
The latest in bird-listing software.

38 **The Catbird Seat** *by Pete Dunne*
Birding opens up an avenue of discovery.

LIVING BIRD
SUMMER 1992 VOLUME 11 NUMBER 3

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Letters

A Change for the Better

When I read that you were making changes in *Living Bird*, my heart sank. After reading the Autumn 1991 and Winter 1992 issues, however, I see that you are enhancing an excellent magazine, not spoiling it. And I'm glad to see that you intend to promote the enjoyment of birds as well as their conservation; I recognize the many threats to the natural world without being unrelentingly bombarded with doom-and-gloom articles.

Ten years back, when your predecessors were contemplating changing from an annual journal to a popular quarterly format, I was asked to make suggestions, and I replied that I'd like to see articles that weren't so scholarly as those in the annual yet weren't oversimplified either; the magazine should appeal to the intelligent layman. I think you have carried out my wishes perfectly.

To show my support for the Lab and your magazine, I plan to upgrade my membership to the next higher category when it comes up for renewal in the spring.

Dorothy R. Weaver
Atlantic Mine, Michigan

Out of Obscurity, a Call to Action

David Wilcove's timely article on the São Paulo tyrannulet ("In Praise of Obscurity," Winter 1992) eloquently brought to the fore the plight of the Brazilian Atlantic coast forests, with their extraordinary richness of flora and fauna.

I was, however, annoyed that the article delivers a powerful message and then abandons the reader to ponder the fate of those forests. There was no hint of any action that could help preserve the remaining forests.

Several U.S. conservation organizations are currently working with Brazilian organizations, both governmental and private, to save the precious remains of the Atlantic forest, including The Nature Conservancy, Conservation International, and the World Wildlife Fund.

Particularly relevant is The Nature Conservancy's participation in efforts to preserve the Lagamar area in the states of São Paulo and Parana. Hundreds of thousands of hectares of prime habitat for the São Paulo tyrannulet as well as a host of other fascinating creatures have been legally protected, and organizations are working to implement effective protective measures. *Living Bird* readers' financial contributions would help those efforts.

In case you don't have the address on the top of your desk, here it is:

The Nature Conservancy
International Program
1815 North Lynn Street
Arlington, VA 22209
(703) 841-5300

Dalcio K. Dacol
Washington, D.C.

Correction

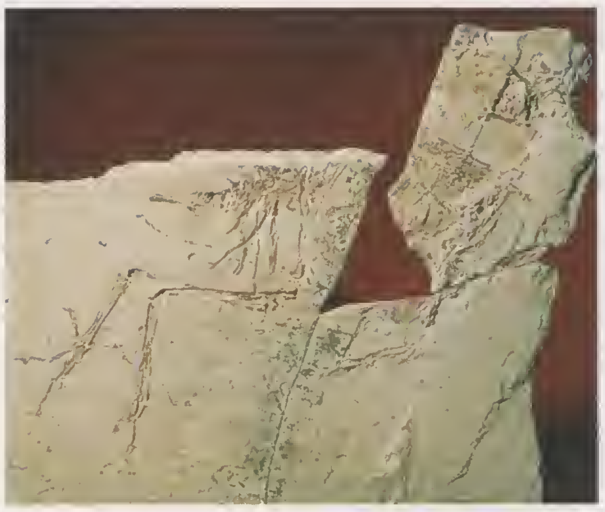
It was a pleasure to see the attractive layout you provided for my article ("Global Warming: An Imminent Threat to Birds?," Spring 1992). However, an unfortunate error somehow crept in after I saw the galleys. The maps illustrating present and predicted vegetation zones show areas shaded in brown with the legend, "no habitat change predicted." The legend is incorrect: Emmanuel et al.'s model in fact predicts *complex* climate and vegetation changes in those regions. In the context of my article, it was unnecessary to show such detailed changes.

Thank you for giving me the opportunity to provide this correction.

Elliot J. Tramer
Toledo, Ohio

We welcome letters from readers. Address letters to: The Editors, *Living Bird*, 159 Sapsucker Woods Road, Ithaca, New York 14850.

BirdNews



PAUL SERENO

FOSSIL FIND MAY BE "MISSING LINK"

A sparrow-sized, fossilized bird discovered in northeastern China is being hailed as the "missing link" between *Archaeopteryx*, the ancestral reptilian glider, and modern birds. Paul C. Sereno of the University of Chicago and Rao Chenggang of the Beijing Natural History Museum recently described the new bird in the journal *Science* (255:845-848;1992).

The 150-million-year-old *Archaeopteryx* has long been regarded as the first bird. Until now, the next-earliest birds known to science were 100 million years old. The new bird, named *Sinornis santensis*, or Chinese bird, fills the gap—it's believed to be 135 million years old. Two similarly aged but less-complete fossil specimens from Spain and Mongolia also exist.

Compared with the Spanish and Mongolian birds, *Sinornis* provides more information: it's the only one of the three with intact hand bones, which reveal the transition from reptilian forelimb to specialized flight wing. *Sinornis* has a grooved wrist bone, which would have allowed the wing to be tucked back while flying or resting, as modern birds' wings do. Also, its finger bones seem to be well adapted for flight, whereas *Archaeopteryx* used its fingers to grasp prey. *Sinornis* does show some primitive, *Archaeopteryx*-like features, including a short, toothed snout and a reptilian pelvis.

PROTECTION FOR CAVE CREEK CANYON

Legal protection is likely for Cave Creek Canyon, the Arizona hot spot known for its trogons, hummingbirds, and other wildlife. The Cave Creek Canyon Protection Act has passed the House of Representatives and is making its way through the Senate; conservationists say the bill is almost certain to become law.

Although passage of the legislation will ensure protection from mining, the future of the unique canyon is still in question. The U.S. Forest Service has proposed to make Cave Creek Canyon part of a new National Recreation Area, a move that biologists and local residents fear would only increase the pressures of development and demands for increased visitor access in the fragile desert habitat.

THE SQUEAKY WHEEL GETS THE (ULP) WORM

Hungry nestlings behave in a way that seems maladaptive, even dangerous. Squawking loudly, they attract the attention of predators as well as parents. Recent research on American robins, however, shows that the benefits of conspicuous behavior outweigh the risks: noisy birds get fed first.

Researchers Henrik G. Smith and Robert Montgomerie of Queen's University in Kingston, Ontario, videotaped 12 nests of six- to seven-day-old robin nestlings, then scored the budding film stars for begging intensity. To evaluate the influence of hunger on begging behavior, some nestlings were removed from the nest for an hour, then returned for a comparison with their more recently fed siblings.

Nestlings that started begging first, extended their necks highest, and held their beaks closest to their parents got fed first. Hungry nestlings begged more intensely than control nestlings, and as a result, the slightly starved birds got the first beakful of bugs more often. In addition, birds were influenced by their nestmates' behavior. When hungry birds stepped up the intensity of their begging, their siblings followed suit.

BILL WOULD BAN BIRD IMPORTS

The declines of 40 bird species have been directly linked to the international pet trade. Now pet industry members and conservationists are watching Capitol Hill to see the fate of two competing bills to limit bird imports. The Wild Bird Protection Act, favored by conservationists, would immediately ban importation of wild birds for the pet trade. The alternative bill, the Exotic Bird Conservation Act, extends bird imports for another five years. At present, the international pet trade is responsible for the capture of about eight million birds annually.

In other developments, New Jersey recently became the second state in the nation, after New York, to ban sales of wild birds for pets. And Petland, one of America's largest pet-store chains, has announced it will stop selling wild-caught parrots. Other actions worldwide may help to limit international trade in exotic birds. The European Community is reviewing a resolution to ban wild bird imports by member nations, and 53 airlines—American and foreign—have agreed to bar shipments of wild-caught birds.

IN MEMORIAM: PETER KILHAM

Birds lost a benefactor and the Lab lost a friend when Peter Kilham died last March. He was 87. Kilham invented the novel, tube-shaped bird feeder that's known worldwide as the Droll Yankee®. He is also remembered for his bird song recording, "Birds of a May Morning."

COMPILED BY CYNTHIA BERGER

Spotlight

SCRUB JAYS AND THE POLITICS OF RACE

by David S. Wilcove

The Endangered Species Act is up for reauthorization. Will subspecies and populations still find protection?

I remember the first time I found a flock of Florida scrub jays, or, more accurately, the first time a flock found me. All I did was open a bag of peanuts, and within minutes, the cheeky little panhandlers were perched atop my head, shoulders, and arms. I was 13 years old at the time, a surly participant in a family vacation to Florida, and while memories of Disney World have more or less faded, those fearless jays of 20 years ago can still bring a smile to my face. I spent the better part of an afternoon with them, but unlike most of my first encounters with interesting birds, I can't tell you the precise date. The Florida scrub jay, after all, is "only" a subspecies of a very common western bird, and according to the rules of bird watching, "subspecies don't count." Having seen lots of western scrub jays in previous years, I never bothered to write down the date I first encountered their Florida kin.

It never occurred to me that the rules of bird watching would one day be endorsed by the Secretary of the Interior in an entirely different context: to determine which creatures should be protected under the Endangered Species Act. The act allows the secretary to protect imperiled species and subspecies of plants and animals, as well as distinct populations of vertebrates. In 1990, when forced to choose between astronomers who wished to build telescopes on Arizona's Mount Graham and the Mount Graham red squirrel, an endangered subspecies of the common red squirrel living in the proposed construction zone, Interior Secretary Manuel Lujan lamented, "Nobody's told me the difference between a red squirrel, a black one, or a brown one. Do we have to save every subspecies?" By expressing displeasure with his legal responsibility to protect subspecies as well as species, Secretary Lujan was lending his support to opponents of the Endangered Species Act, who are eager to eliminate protection for both subspecies and populations.

Their reasoning is simple: No subspecies or populations means a shorter list of endangered plants and animals, and a shorter list means fewer hassles. Without a protected subspecies of the spotted owl, logging of the ancient forests of the Pacific Northwest might not be blocked. Without a listed population of the California gnatcatcher around San Diego, real estate developers could convert more of California's coastal scrub into housing tracts. Because the Endangered Species Act is up for reauthorization this year, a battle over the issue of protecting subspecies and populations seems imminent.

For the Florida scrub jay, a protected subspecies under the act, the outcome could be a matter of life and death. The bird's extinction would not leave us bereft of scrub jays, since other races inhabit the western United States and Mexico. Nevertheless, the case of the Florida scrub jay demonstrates why saving subspecies and populations is the right thing to do.

What might we lose if the Florida scrub jays vanish? A unique opportunity to glean some fundamental insights about the way environmental conditions mold social behavior. Behaviorally, Florida scrub jays differ strikingly from their western relatives. In the western United States, scrub jays disperse from their birthplaces in search of their own territories before they are a year old. But in Florida, young jays usually remain for one or more years with their parents, assisting them in raising new generations of siblings. For over 20 years, this difference has intrigued ornithologists Glen Woolfenden and John Fitzpatrick, who have been studying a population of scrub jays in central Florida. Their extraordinary work has provided us with a rich portrait of jay society.

Together, parent jays and their helpers defend a territory of about 25 acres, which they occupy year-round. The territory is "owned" by the breeding pair, and ownership is passed on to a sequence of replacement breeders or offspring heirs indefinitely. If one of the breeding pair dies, the survivor usually acquires a new mate and continues to control the territory. On the rare occasions when both breeders disappear at once, the dominant nonbreeding male among the helpers acquires a mate from outside, inherits the territory, and becomes a breeder. "Divorce" is very rare among Florida scrub jays, with most pairs staying together until death.

Thus, a young Florida scrub jay has very limited opportunities to acquire a territory and mate of its own. One way, as noted above, is through inheritance. Another way is by finding a widowed jay in another territory and moving in as its mate; this approach is especially popular with young females. Young males often employ a third strategy. With assistance from parents and other family members, a male helper expands his natal territory by fighting with his neighbors. The young male then pairs with a female from outside the family (thereby avoiding incest), and the two begin to defend the newly captured ground, which sometimes includes a portion of his parents' original territory. The male's parents and family members retreat to their now-shrunken territory, and the new couple vigorously defends its turf against outsiders. Remarkably, hostility toward the male's family develops much more slowly, and years later, father and son can still traverse each other's territories unchallenged.

Woolfenden and Fitzpatrick believe this complex social behavior is a consequence of the birds' highly restricted habitat. Florida scrub jays occur only on ancient sand dunes that now support a peculiar, dwarf oak habitat. One of their main population centers is a 10-by-100-mile area known as the Lake Wales Ridge—a region formed millions of years ago when rising seas washed across much of peninsular Florida and deposited a strip of enormous sand dunes in the center of the state. Today, the dunes are dominated by an elfin forest or "scrub" of oaks, hickories, pines, and rosemary. Since scrub habitat is naturally scarce, the odds of a young bird finding a vacant territory are slim to none. Natural selection has favored birds that remained with their parents, assisted them in the production of more offspring, and waited until a vacancy appeared—not unlike the strategy employed by young New Yorkers who live with their parents while waiting for a rent-controlled apartment to open up. What at first appears to be rather altruistic behavior on the part of the jays is, in the words of John Fitzpatrick, "a selfish adaptation to living in a crowded, highly competitive environment."

DAN POLIN

Florida scrub jay society packs the maximum number of birds into a constantly shrinking, sandy patch of scrub that's home to other endangered species as well.

Unfortunately for the jays, Florida's scrub is a fine place to grow citrus trees and build houses. About 90 percent of the Lake Wales Ridge scrub has already been destroyed, with more acres vanishing every day. In a state where frenzied development has become a virtual religion, the already crowded world of the scrub jay is constantly shrinking.

And that may be the most important reason of all to worry about the jays. The ancient scrub of the Lake Wales Ridge supports one of the highest concentrations of rare species in the world. At least 33 plant species restricted to scrub are either listed as endangered species or under consideration for listing by state and federal authorities. Included among them are the Lake Placid scrub-mint, whose leaves contain an organic insect repellent, a mouse, a firefly, and a nearly legless lizard that slithers through the sand. Among this group, the jay stands out as a "flagship species." It is colorful, charismatic, and tame. It captures the attention of people who will never see or hear about the Lake Placid scrub-mint or the sand skink. Moreover, the lands we protect for the benefit of the jays are certain to harbor other rare plants and animals, including species whose very existence may be unknown to us now.

For the embattled jays, protection against the interior secretary's efforts to remove them from the endangered species list has come from an unlikely source: the laboratories of the University of Chicago. Recent biochemical studies conducted there by A.T. Peterson indicate that Florida scrub jays are, in fact, a distinct biological species and not "merely" an isolated race of an abundant western bird. This means that even if opponents of the Endangered Species Act succeed in eliminating protection for subspecies and populations, Florida scrub jays will still be covered. Good news for them, certainly, but it still leaves plenty of other endangered animals out in the cold, including Cape Sable seaside sparrows, least Bell's vireos, light-footed clapper rails, bald eagles, peregrine falcons, roseate terns, grizzly bears, and gray wolves—all of which are protected as subspecies or distinct populations. Secretary Lujan and opponents of the Endangered Species Act keep forgetting a simple truism: Subspecies and populations become endangered for the same reasons species do. We destroy their habitats or we pollute their air and water. Ignoring the messenger won't change the message. ■

David Wilcove is an ecologist with the Environmental Defense Fund in Washington, D.C. He also serves on the board of directors of the U.S. and Pan-American sections of the International Council for Bird Preservation.

Further Reading

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SAVE NOW *or* PAY LATER

by Greg Butcher and Rick Bonney

Migrant songbirds face an uncertain future, unless we take action now

In 1976, as a junior at Connecticut College, Greg Butcher participated in a long-term census of birds and vegetation in The Connecticut Arboretum in New London, Connecticut. The census had started in 1952, the year of his birth, and focused on two areas: an old field abandoned just before the study began, and a mature, mixed forest virtually uncut since the Revolutionary War.

Quiz question: After 24 years, which habitat showed the greatest change in bird populations?

If you answered "old field," you are correct. Animal populations change quickly as a field reverts to shrub and then forest. In this case the pheasants, goldfinches, and field sparrows common in the weedy field had given way to red-eyed vireos, black-and-white warblers, and American redstarts—birds common in most eastern woodlands.

Nevertheless, if you discounted the possibility of significant bird population changes in the "undisturbed" forest, you're in for a surprise. Even though the vegetation structure had changed very little in two decades, four bird species had disappeared (ruffed grouse, eastern wood pewee, black-throated green warbler, and Canada warbler), and two species had declined seriously (red-eyed vireo and hooded warbler), even though habitat for all these birds still seemed plentiful.

If you know why this trend occurred, you've been keeping up with current ornithological literature. The culprit is known as forest fragmentation. Although little had changed *within* the undisturbed forest, lots of development had occurred *around* it, and the study area had become increasingly isolated from similar habitat nearby. Forest fragmentation is bad for woodland birds because it renders them susceptible to predation and nest parasitism. Predators such as jays, crows, grackles, raccoons, and cats, as well the parasitic brown-headed cowbird, are abundant in disturbed, open habitats, and less common in large woodlands. But if a forest is dissected by roads, power line cuts, and the like, or if it becomes surrounded by open or suburban habitat, then predators and cowbirds can penetrate a forest with ease.

Next question: What did the declining birds on The Connecticut Arboretum have in common? Next answer: All except the ruffed grouse were neotropical migrants, a name that refers to about 250 species of birds that breed in North America but winter south of the border, either in Mexico,

ILLUSTRATION BY STEVE CARVER

ARTHUR C. SMITH (GRANT HEILMAN PHOTOGRAPHY) 2

Neotropical migrants such as the yellow warblers, above, and the golden-winged warbler, far right, are extremely vulnerable to habitat changes in North America, where they breed, and also on their wintering grounds in Latin America. Below right, one result of forest fragmentation: a cowbird has laid its eggs in a warbler nest.

the West Indies, Central America, or South America.

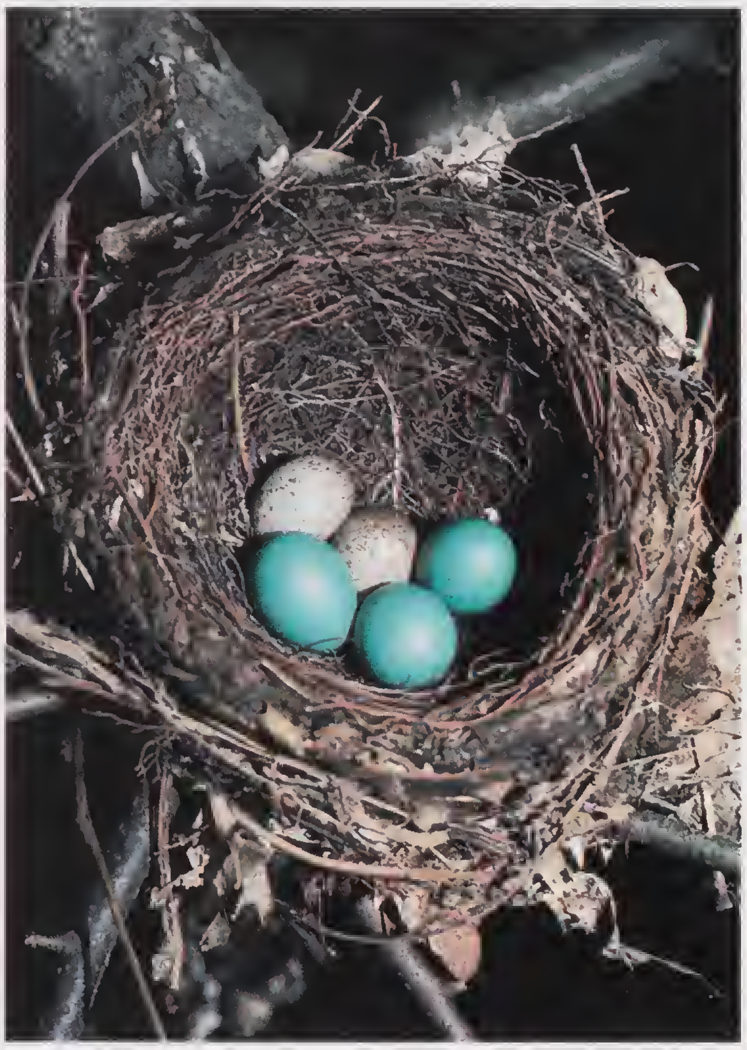
Final question: Why did neotropical migrants decline more than other species? Probable answer: They are more vulnerable than other birds to forest fragmentation because they tend to nest on or near the ground, they build open, cup-shaped nests that are easy for predators and nest parasites to spot, and they have time to raise only one brood per year.

Now, declining birds on The Connecticut Arboretum alone would probably not be cause for worry. Unfortunately, similar declines of neotropical migrants, in particular those that prefer forest interior habitats, have been documented elsewhere, especially along the Atlantic Coast in the megalopolis that extends from Portland, Maine, through Richmond, Virginia. Taken together, these declines have led to increasing concern that forest fragmentation on summer breeding grounds poses a major threat to the survival of several neotropical bird species.

If you follow the conservation news you're probably aware of another problem related to migratory birds: deforestation in Latin America where our summer birds spend the winter. Although the exact effects of deforestation on wintering migrants are still under investigation, in 1989 Chandler Robbins of the U.S. Fish and Wildlife Service (USFWS) and three colleagues published a sobering paper showing that deforestation could well be causing declines in a number of neotropical migrants. These birds are highly susceptible to winter habitat loss because their tropical wintering region is very small compared with the temperate breeding area they use in North America. In fact, densities of migrant species on the wintering ground may be five to eight times higher than on the breeding grounds. As a result, the destruction of just a small amount of tropical habitat can have a huge effect on migratory bird populations. Species that are geographically restricted to a small range, such as the cerulean and golden-cheeked warblers, face the greatest risk. And areas with some of the highest rates of deforestation—the Greater Antilles, Mexico, and Central America—also have the greatest concentrations of migrants.

Furthermore, most tropical forests are cut down to make way for agriculture. Therefore, even bird species that can use cleared and scrubby habitats may be exposed to harmful agricultural chemicals, especially pesticides. Some pesticides, including chlorinated hydrocarbons such as DDT, have been outlawed in the United States but are still supplied to Latin American and Caribbean farmers.

Mounting concern for the future of neotropical migrants among numerous ornithologists and conservationists led to a December 1989 symposium, sponsored by the Manomet Bird Observatory, on the conservation and biology of these birds. At that symposium, most participants agreed that the threats to these birds were serious and many, and that population declines were getting worse. In fact, Sidney Gauthreaux of Clemson University used data from radar images of migrating birds to suggest that migration across the Gulf of Mexico may be one-half of what it was in 1960.



TODD FINK/DAYBREAK IMAGERY

What to do? Enter the National Fish and Wildlife Foundation, a quasi-governmental group founded by Congress in 1984 to promote innovative public and private partnerships to enhance the conservation of the nation's natural resources. In 1990 the Foundation launched a neotropical migratory bird conservation program called Partners in Flight—Aves de las Americas, which has been promoting bird research, monitoring, and conservation at an impressive scale. Already eight federal agencies have signed a Memorandum of Agreement to cooperate on this issue, including all five major landowning agencies: the U.S. Forest Service, Bureau of Land Management, National Park Service, USFWS, and Department of Defense. In addition, a number of nongovernmental organizations, including the Cornell Lab of Ornithology, Conservation International, and the Smithsonian Migratory Bird Center, have signed a Memorandum of Understanding to work with the eight government agencies.

The goals of Partners in Flight are to improve our understanding of neotropical migrants, to identify those species most at risk, and to develop plans for protecting their habitat. Although the program is still young, progress has already been made. Five central working groups have been established—research, monitoring, legislative, international, and information and education, with an additional five regional working groups organized throughout the United States and the Caribbean. These groups comprise individuals from the various government agencies as well as conservation groups, and all are at work developing plans for migrant bird conservation. Two national meetings have been held, and a third, planned for September 22-25, 1992, in Estes Park, Colorado, will focus on putting current knowledge about neotropical migrants where it's most needed—into the hands of various land managers. In addition, the information and education working group is producing a newsletter, of which two issues have already been published, and a slide show aimed at land managers and the informed public, which will soon be available.

Some people are concerned that such a massive effort for neotropical migrants is misguided. They point out that few of the officially listed endangered species in the United States are neotropical migrants, that populations of some permanent residents and short-distance migrants are declining more rapidly than the neotropical migrants, and that in tropical countries, year-round residents are the most endangered species. The critics may be right on all three counts. Nonetheless, we believe the neotropical migratory bird conservation program is completely justified and deserves a high priority.

Conservationists must work on behalf of neotropical migrants now because the sheer complexity of the migratory system makes these birds vulnerable in ways that resident birds are not. Consider: a migrant requires habitat not only on the breeding grounds and the wintering grounds but in the migration zone between. For example, destruction of critical coastal habitats along the Gulf of Mexico might leave migratory birds with no place to land following their nocturnal overwater flight. Therefore, even if all breeding and wintering habitats for migrants were preserved, their populations could still plummet.

Or contemplate global warming scenarios, which suggest that the heat will be turned up most in temperate zones. This could allow increased survivorship of nonmigrants that winter in these areas. Such warming could, however, be disastrous for neotropical migrants: competition with increasing resident birds would probably result in much less space for migrants during the breeding season, even if wintering habitats and migration routes remained healthy.

Away from the megalopolis, much of the northeastern United States is reverting to forest because marginally productive farms are being abandoned. Increased woodland should be a boon for forest-dwelling neotropical migrants. However, if wintering habitat is shrinking because of tropical deforestation, migrants could decrease despite improving conditions on the breeding grounds.

A migratory bird conservation program also offers a tremendous political advantage. Many other conservation programs promote the idea that we are all in today's environmental mess together. When dealing with migratory birds, however, the connections are particularly obvious. After all, birds fly from public land to private, from state to state, and from nation to nation. While efforts have previously been made to promote conservation south of the U.S. border, many more will be made under the Partners in Flight banner. Because the program focuses on bird habitats on the breeding grounds, wintering grounds, and migratory stopover sites, it necessarily is interested in bird habitat throughout the New World. Much of this habitat supports endemic species as well as migrants, therefore much of the work of Partners in Flight should benefit all birds, regardless of their migratory status.

Partners in Flight also represents one of the few times that government agencies have reached out to the public and to private organizations in a cooperative effort for conservation. At the Lab of Ornithology, we're working to help make it a model for the future. ■

Greg Butcher is director of the Lab's bird population studies program and chair of the monitoring working group of Partners in Flight. Rick Bonney is director of education and information services at the Lab and co-chair of the Partners in Flight information and education working group.

Further Reading

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What You Can Do

You don't have to be a full-time scientist or political activist to help neotropical migrants. Follow these simple steps and get involved today!

Step 1. Educate yourself. Learn as much as you can about the problems facing neotropical migrants, and about possible solutions. Here are some useful resources:

■ **The Migratory Bird Information Kit,** co-produced by the Smithsonian Migratory Bird Center and the National Audubon Society, contains a wealth of information and "how-to" materials, including 1) a 32-page, full-color booklet on the ecology of forest-dwelling songbirds and the reasons for their decline; 2) a bilingual checklist of songbirds that migrate to Latin America and the Caribbean; 3) an international directory of Latin American groups that want to establish partnerships with U.S. groups; and 4) briefing papers that tell how to protect songbird habitat in your community, in Latin America, and through federal and state policies.

To get your copy, send $6.50 to: Migratory Songbird Coordinator, National Audubon Society, 666 Pennsylvania Avenue SE, Washington, DC 20002.

■ **Partners in Flight—Aves de las Americas** is described in detail in the accompanying article. Of particular interest to citizen activists are the regional and state working groups organized to establish strategies for habitat protection and management.

To receive the free quarterly *Partners in Flight* newsletter, write to Peter Stangel, Program Director, National Fish and Wildlife Foundation, 1120 Connecticut Avenue NW, Washington, DC 20036.

■ **The following books** provide in-depth information on the decline of migratory bird populations. They're available at many bookstores and libraries:

Birds in Jeopardy by Paul Ehrlich. Stanford: Stanford University Press; 1992.

Where Have All the Birds Gone? by John Terborgh. Princeton, New Jersey: University Press; 1989.

Step 2. Be a Desktop Activist. You can help neotropical migrants right from your desk. Here's how:

■ **Support state nongame programs:** Check the box marked "nongame programs" on your state income tax form. Your tax-deductible donation will help fund research and management programs for nongame species, including migratory birds. If your state doesn't have a "check-off" program, contact your wildlife department to start one. A list of regional nongame coordinators is provided in the Migratory Bird Information Kit (see above).

■ **Write to your elected representatives.** Support legislation that will help migratory birds.

The Endangered Species Act is scheduled for reauthorization in 1992. Although only a handful of migratory bird species are currently on the threatened and endangered lists in the United States, many species and subspecies languish in the huge backlog of candidates waiting to receive attention.

We need legislation that provides protection for candidate species *before* they reach the threatened or endangered list. Urge your elected representatives to support HR 4045. Point out that rescuing species from the brink of extinction is often impossible and always expensive.

Federal Appropriations: Congress appropriated significant funding for migratory bird and other nongame programs within federal agencies for the first time last year. This year, environmental groups are calling for a $6.44 million add-on for nongame bird programs. Write to your representative to advocate increased appropriations for migratory bird programs.

Foreign Assistance: Rapid population growth in many Latin American countries puts a strain on forests and other resources; the protection of tropical forest habitat hinges not only on conservation policy but also on international family planning efforts. Congress is considering important legislation on family planning as well as sustainable forestry and agriculture, energy, biodiversity, and other development issues in Latin America. Let your elected representatives know that you support foreign assistance that will promote sustainable use of natural resources.

To voice your support for legislation, write to:

The Honorable (your Congressman)
U.S. House of Representatives
Washington, DC 20501

The Honorable (your Senator)
U.S. Senate
Washington, DC 20501

Step 3. Be an Activist in Your Own Backyard. Migrating birds need stopover sites for food and rest. Your backyard can be a temporary haven for some migrants, especially if it's landscaped to provide natural foods and shelter.

Here are some great books to help you get started. Your library or county extension office will have other publications pertinent to your region.

The Wildlife Gardener, by John V. Dennis. New York: Alfred A. Knopf; 1988.

Songbirds in Your Garden, by John K. Terres. New York: Harper and Row; 1987.

Note: When enhancing your backyard habitat to attract birds, don't forget to make it a *safe* place, too. Avoid pesticides, bell your cat, and position your feeders to prevent deadly window collisions. Make sure your compost pile and garbage cans don't attract songbird predators such as raccoons.

Step 4. Put Your Birding Skills to Work. Enjoy the rewards of working with others to protect migratory birds.

■ **Participate in monitoring and banding programs.** Volunteer programs include the Breeding Bird Survey, the Breeding Bird Census, state atlasing programs, Christmas Bird Counts, Winter Bird Population Studies, and banding projects. There's no better way to get hands-on involved.

For a directory of volunteer opportunities with federal agencies, send $1.00 to: Volunteer Directory, American Birding Association, P.O. Box 6599, Colorado Springs, CO 80934. Or contact your local Audubon Society, state ornithological society, local bird club, or the Lab of Ornithology to find out about organized monitoring programs in your area.

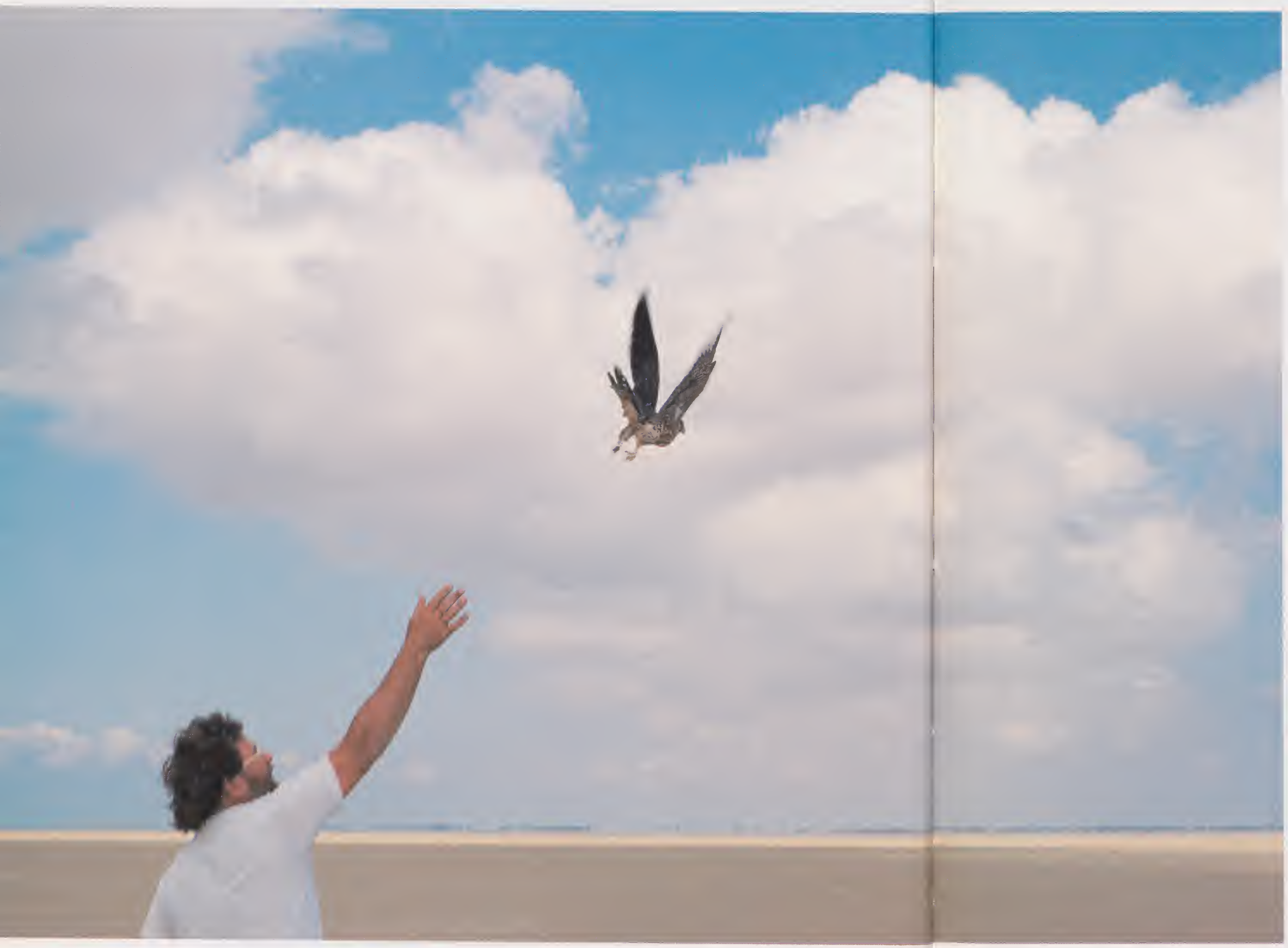
Step 5. Spread the Word.

■ **Speak out.** Multiply your efforts by spreading the word through the media: write a letter to the editor, or an op-ed piece. How about making presentations to local clubs and teachers' groups? You can borrow a terrific slide show produced by Partners in Flight expressly for this purpose. The show will be available from the National Fish and Wildlife Foundation in August 1992.

■ **Forge international friendships.** International cooperation will be essential to stem the tide of declining bird populations. The Migratory Bird Information Kit (see above) tells you how to establish partnerships with—or send birding equipment to—Latin American conservation groups. The National Audubon Society's "Save our Songbirds" program matches local Audubon chapters with Latin American nongovernmental organizations.

Whatever approach you take—writing letters, landscaping your backyard, censusing birds, or sending equipment to a Latin American partner—the most important thing is to get started. Take one simple step to protect migratory birds. If you don't, who will?

Susan Carlson
Chapter Program Director
National Audubon Society



This windswept barrier island draws scores of migrating falcons and the researchers who come to study them

Falcon researcher Bud Anderson releases a newly banded peregrine he trapped minutes earlier on the tidal flats of Padre Island, Texas.

The Peregrines of Padre Island

Text and photographs by Tim Gallagher

OCTOBER 8—As I drive across the causeway leading from Port Isabel to South Padre Island, Texas, I'm amazed at the number of buildings I see: luxury high-rise hotels, restaurants, souvenir shops, condos, real estate offices. A gaudy billboard stuck in the middle of a mudflat announces the island's name and cautions us not to litter, while a bronze statue of Spanish missionary Padre Ballí—the "father" of Padre Island—stands with a hand raised to bless passersby as they reach the end of the causeway.

I can't help but remember how different the island looked the last time I was here, some 20 years earlier. The Queen Isabella Causeway had not yet been built, stores and restaurants were hard to find, and there were no high-rise hotels—just a few tiny beach motels on the southernmost stretch of this long, narrow barrier island. But one thing has not changed in the two decades since I last visited Padre Island, and it is the same thing that drew me here both times. This thin strip of storm-swept sand dunes is the scene of a great natural spectacle: the biannual gathering of migrating peregrine falcons en route to and from their far northern nesting areas.

Padre Island is a typical barrier island—long, narrow, and dune covered. Starting just offshore from Corpus Christi, it follows the Texas coast almost all the way to Mexico, more than 120 miles south. But three-quarters of the way down the island's length, Mansfield Channel slices through, allowing shrimp boats, pleasure crafts, and other shipping to enter and leave Laguna Madre from the Gulf of Mexico. Called "the cut" by locals, the channel divides Padre into a north and a south island. The bulk of the north island has been preserved as the Padre Island National Seashore, while South Padre Island is a popular Texas tourist trap. Sun-seekers and other visitors flock here by the thousands to enjoy the warm weather, picturesque beaches, or the fishing. A few come for the birds.

In that respect, South Padre Island is no disappointment, especially for a peregrine watcher. The island is a convenient migration midpoint for the falcons, where they can rest and build up fat stores before continuing on a

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journey that may stretch from the Arctic Circle all the way to Argentina or Chile. The falcons, which are mostly the "tundra" subspecies of peregrine, pass the bulk of the year in South America, spending only the mild summer months on their breeding grounds in Alaska, Canada, or Greenland.

Though large numbers of peregrines pass through other places in North America on migration—Assateague Island, Cape May—Padre Island is unique in two respects: first, unlike the other areas, many falcons stay on Padre for weeks at a time, using it as a staging area; and second, peregrines gather here in significant numbers during both autumn and spring migrations. The other peregrine migration hot spots are outstanding in the autumn, when hordes of newly fledged juveniles make their first trek southward, but the northward migration in spring produces barely a trickle of falcons. Consequently, Padre Island has been a boon for falcon research.

OCTOBER 9—Before I arrive at the beach house where I'll be meeting a group of falcon researchers, I spot a beautiful adult female peregrine perched on the rigging under a water tower. She is amazingly tame. I set up my camera and tripod right under her and snap pictures at will. Her lack of suspicion is fairly typical for the Arctic birds, which have little contact with humans most of the year. As I pack up my gear and leave, she is still perched there, calmly watching.

Tom Maechtle, head of the Padre Island Peregrine Falcon Survey (PIPFS), has been studying the falcons on the island since 1985. Each spring and fall, he brings a team of researchers to Padre Island, where they spend an entire month studying peregrines, watching their behavior, trapping and banding them, and collecting falcon blood samples for DNA and contaminant analysis.

"I've been fortunate to have such a dedicated group of people working with me on Padre Island," says Maechtle. "The same people return year after year, and each one is an expert falcon trapper. Some of them take vacation time from their regular jobs to come down here. Our success depends on them."

Fortunately, the peregrine falcon has had little trouble over the years attracting the attention of humans who are dedicated to its well-being. When DDT and other persistent chemicals in the environment caused the peregrine falcon population to crash in the 1960s, prominent ornithologists such as Tom Cade of Cornell University rushed to turn around the species' perilous decline. Cade established The Peregrine Fund and enlisted the aid of scores of falcon enthusiasts willing to work long hours for minimal wages to help bring the falcons back. Thanks to their efforts, peregrine falcons once again breed in the eastern United States (where they had been extirpated) and their numbers are up throughout North America.

Tom Maechtle, who now lives in Boise, Idaho, worked for The Peregrine Fund for several years when it was headquartered at the Laboratory of Ornithology. He stayed at the "hawk barn" in Sapsucker Woods, where peregrines were being bred in captivity to provide young falcons for the reintroduction program. "I tended peregrine hack [release] sites every summer while I was in high school," says Maechtle. "I stayed at the first hack site at Taughannock Falls near Ithaca in the mid-1970s. Then after I graduated I came to work at The Peregrine Fund full time."

Many of the falcon researchers I spoke with had similar stories to tell. Most had been obsessed with falcons since childhood. For Oscar Beingolea, who came all the way from Peru to trap falcons on Padre Island, the peregrine falcon is the supreme winged predator—a bird of power, grace, and beauty. Like the other team members, he is fascinated by the mystery of where the peregrines come from and where they go on migration. He believes the only way that we can even begin to understand the peregrine migration is to retrap large numbers of banded Arctic falcons in South America.

"We have retrapped several birds in Peru that were banded in North America," says Beingolea, "three from Padre Island, Texas, two from Cape May, New Jersey, and one from Rankin Inlet, Canada. The last bird's story is very nice, because he was banded at a nest in Rankin Inlet in 1982 and I trapped him in Peru in March 1989. He was then resighted at his nest in Canada later that summer. So, for that bird, we now know where he nests and perhaps where he winters each year. We need to track more birds that closely."

The Padre Island survey is only a small part of team member Bud Anderson's work with falcons. He is also director of the Falcon Research Group, a nonprofit organization based in Bow, Washington. He spends most winters in South America tracking Arctic peregrines on their wintering grounds. "There's a loose network of falcon researchers," says Anderson. "We study peregrines in Alaska, Canada, Greenland, South America, and the migration spots in between. We all know each other and keep track of each other's work. Tom Maechtle hires me in the spring and fall to band peregrines on Padre Island and that dovetails nicely with my research in South America."

What is perhaps most remarkable about Maechtle, Anderson, and many of the others is that they are not affiliated with a university or major research institution. They must seek government and private funding independently to carry on their work.

Each morning as dawn breaks over Padre Island, the trappers have already loaded up their All-Terrain-Vehicles (ATVs) and are headed up the beach toward the prime falcon areas. Survey team members often spend more than 12 hours a day driving slowly up and down the island, stopping frequently to scan for falcons. It is a harsh environment, where the trappers may face searing heat, blowing sand, mosquitoes, rain, and a chill Gulf wind, all in the same day. Still, it's an experience that few survey team members can stand to pass up come spring and autumn.

OCTOBER 10 — As I drive my ATV across the broad expanse of tidal flats on the back side of Padre Island, I can't help thinking of a scene from "Lawrence of Arabia." Lawrence and the Bedouins, riding atop huge camels, are trudging across a barren, trackless landscape called "the anvil of the sun," pounded mercilessly by endless shimmering heat. Now I know how they felt. The back side of Padre Island seems almost as remote (and hot) as the Arabian desert. Hard to imagine that only 20 miles south on the developed end of the island high-rise hotels and condos tower above the shifting sands.

Though peregrines are seen just about everywhere on Padre Island—flying along the shore, perched on tall buildings, or sitting on sand dunes—the PIPFS trappers prefer to patrol the huge tidal flats on the landward side of the island, where most of the peregrines gather. An ATV is the only practical vehicle to drive on the flats. Anything else would get stuck immediately in the soft, damp sand. Each ATV is a self-contained mobile trapping station, with portable traps, optical gear, bands, blood sampling equipment, a two-way radio, food, and water—everything needed for a full day of trapping.

Above, Oscar Beingolea (left) and Bud Anderson confer during a trapping run on Padre Island. The ATVs they drive are ideal for crossing the soft sand on the tidal flats. Peregrine falcons such as this adult female, below left, have used Padre Island as a migration staging area for millenia.

OCTOBER 11 — I sit on my ATV scanning the horizon with binoculars. The flats look as lonesome as the moon. A brown object moving at the edge of the dune line catches my eye—a coyote searching for refuse washed ashore. At high tide, water rushes onto these flats, erasing our tire tracks and bringing new objects for coyotes and other beachcombers to scavenge. Looking back toward Laguna Madre I see a nondescript shape on the sand near the water's edge. I can't make out any detail, but the tilt of it, the way it seems to be leaning into the wind, convinces me it is a peregrine. I turn and drive quickly upwind for a better look.

When most people think of a hunting peregrine falcon, they picture the bird hurtling down on its prey from a high altitude. The hunting style on the flats of Padre Island is about as far removed from that image as you can get. Here the falcons usually sit on the sand, or on any available perch—a post, an old crate, or a piece of driftwood—and wait. When potential prey flies over, the falcon takes off from ground level and attempts to intercept it. This is an unusual hunting tactic. Peregrines normally rely on surprise and an altitude advantage to overtake their prey, dropping from a lofty perch or diving down out of a soar. In most situations, a high-flying bird would be long gone before a falcon sitting at ground level could build up enough speed to overtake it. But on the broad tidal flats of Padre Island, the predator-prey relationship shifts to the falcons' advantage.

The tidal flats of Padre Island have served the peregrines for millennia as a vast, open bird trap. Songbirds, shorebirds, waterfowl, and other migrants making the crossing to Padre Island are already exhausted from their long journeys. But before reaching the safety of the dune grass and other vegetation in the middle of the island, they must first cross Laguna Madre and then pass over a wide "no man's land" of flat, barren sand. It is a dangerous crossing for any bird that attempts to run this gauntlet. At times, several falcons will fly out to intercept one bird.

Sometimes the prey is another raptor. On this trip I saw a peregrine dive repeatedly at a tiny sharp-shinned hawk. The smaller bird managed to sidestep the falcon's stoops time after time, and it finally reached cover safely. But Mark Robertson, a long-time PIPFS trapper, recalls seeing a merlin that wasn't so lucky. Half a dozen peregrines chased the smaller falcon back and forth, high over the flats, until it was finally caught.

It is a grim but efficient process. Migrating peregrines must conserve energy and build up fat stores before continuing their own perilous journeys, where they too might face death through starvation, collisions with power lines or vehicles, attack by other predators, or poisoning by toxic chemicals.

OCTOBER 12 — We spot a hatch-year male peregrine perched on a low piece of driftwood at the edge of an inlet. We set out a portable trap for the bird. Before we can even drive away, the falcon and two others start diving at the trap. We set another trap and all three birds work them as we watch. Two birds are down on the traps, then the male tries to fly off and is caught. We move in quickly.

The PIPFS team always splits into two groups during peregrine migrations; one stays in a beach rental on the south island, while the other sets up camp on North Padre Island. The camp is rough—sandy, windblown, and full of mosquitoes at night. Ferrying the ATVs, tents, and other equipment across the channel is always an adventure. To get to North Padre Island, each trapper drives his ATV onto a large plywood board on top of a rubber raft, then floats it carefully across the channel. The crossing can be a hair-raising experience, especially if a powerboat cruises down the channel and kicks up a wake. But so far none of the ATVs (or falcon trappers) has ended up at the bottom of the channel.

The survey crews have developed their falcon trapping techniques to a fine art. They know how to recognize peregrines at extreme distances, how to set up traps quickly, and how to lure in a falcon effectively. But the after-capture work is even more impressive, as the trapper hurries to process the falcon, record data, and release the bird in 15 minutes or less to avoid undue stress. The first step is to slip a leather falconry hood over the peregrine's head (the darkness provided by a hood has a remarkable calming effect on a

This hatch-year male peregrine, far left, will have a blood sample taken, a band attached, his data recorded, and then be released, within 15 minutes of capture. Oscar Beingolea of Peru, above, scans the broad tidal flats for the familiar shape of a peregrine falcon.

The flats look as lonesome as the moon. At high tide, water erases our tire tracks and brings new objects for coyotes and other beachcombers to scavenge.

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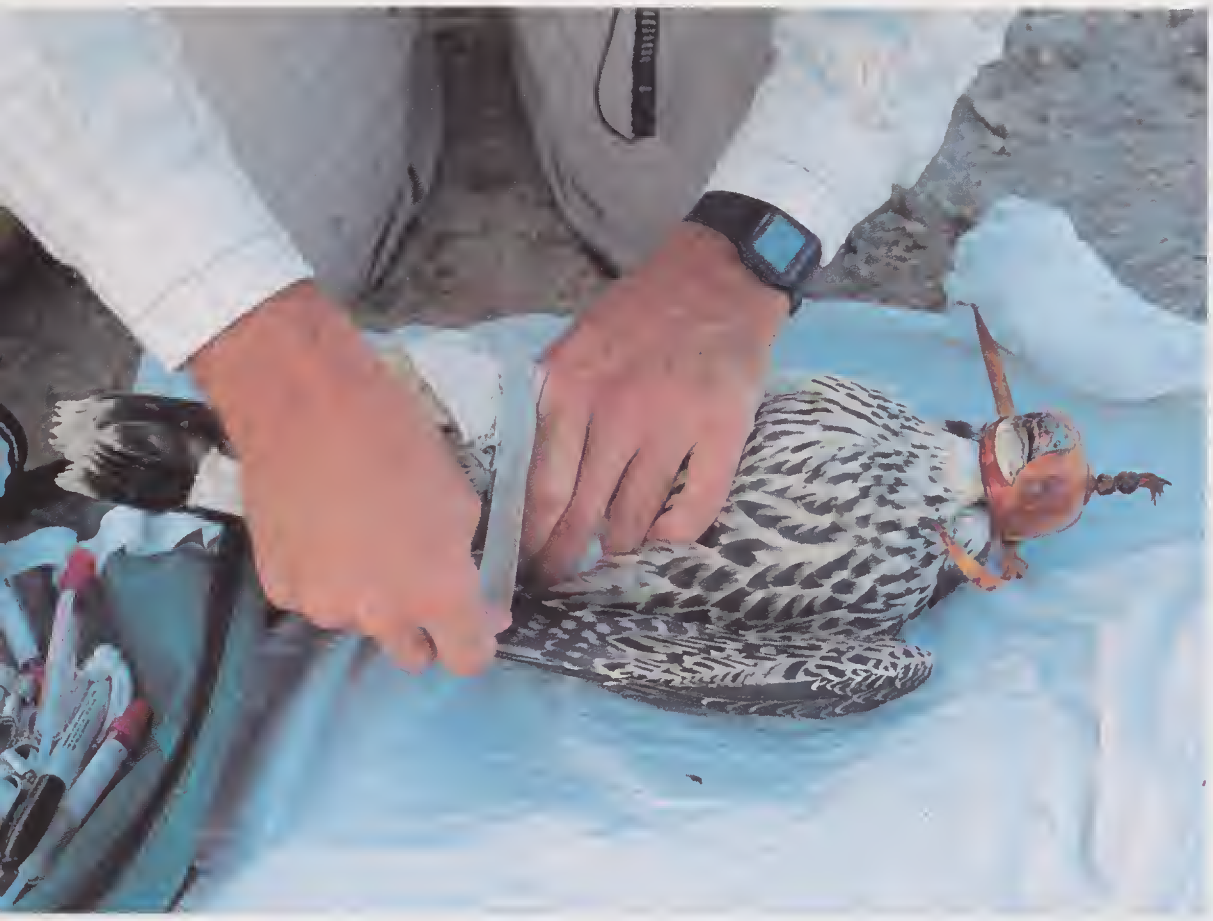


Each falcon is hooded immediately after capture, above. Falconry hoods have a remarkable calming effect on raptors. Author Tim Gallagher, below, holds a newly trapped female peregrine falcon.

BUD ANDERSON

falcon). Then the bird is taken from the trap and placed in a light cotton straitjacket to hold it steady. Next the trapper bands the falcon, takes a tiny blood sample, and then daubs the bird's breast with a harmless dye. The color mark helps trappers to distinguish an already-caught falcon from a fresh one, to save wasted effort. The dye generally fades away in three or four weeks in the sunlight, rain, and salt spray the birds are exposed to. The falcon is then set free. It's a remarkably smooth, efficient procedure.

OCTOBER 13 — We catch a hatch-year male peregrine at midday. Processing the bird is hell. The day has turned hot and sticky. As we hurry to band the falcon and take a blood sample, the air around us fills with tiny buzzing gnats. They cover our faces, crawling in our eyes and up our noses and ears. The sound is deafening. It is impossible to breath without inhaling them. Our eyes fill with sweat. Finally we finish up, release the bird, and blast down the beach on our ATVs at full speed to blow away the gnats.

Collecting falcon blood samples is an important part of the PIPFS team's work. Researchers hope eventually to be able to pinpoint the area where particular falcons were born by analyzing their DNA. Then if an unbanded peregrine falcon is captured in South America during the winter, a simple blood test could reveal whether the bird was a native of the area or a migrant from Alaska, Canada, or Greenland.

"We also record the levels of toxins that accumulate in the blood of individual falcons," says Maechtle. "We'll look at those samples where we have a falcon, for example, that was caught in 1985 as a hatch-year bird, then caught again in 1987 and 1990, and we'll measure whether the bird's contamination level has increased over time. We get enough retraps on the same birds to make that possible. We may not get them every year, but we often recapture them every third or fourth year."

OCTOBER 14 — We're in the doldrums now. Everyone is hoping for a northern front. The birds ride the storms all the way down from Alaska and northern Canada. The trappers depend on them for a good migration. A strong storm front will flush out the birds that are already here, sending them on their way to South America, and bring in a new batch of unbanded falcons. Many of the ones we see on the flats now are already color marked.

The falcon retrap rate on Padre Island is astounding. In the spring, fully 30 percent of the falcons caught are birds that were previously banded on the island, which shows how faithful birds are to a migration route. "It's not just by chance that we're capturing them here," says Maechtle. "The falcons have as great a fidelity to a staging area as they do to their nesting grounds."

Maechtle believes that this may also be true of the falcons' wintering grounds. Perhaps the birds are on their way to a particular favorite perching area in South America. That's why the work of Maechtle and the others is important: so that prime pieces of falcon wintering ground, as well as staging areas, can be identified and then preserved. Above all, he believes that the research on migrating falcons must continue.

"If we don't continue to monitor peregrine falcons," says Maechtle, "we could easily slip back into the same scenario we faced in the 1960s when the birds' population crashed. Only by keeping track of the birds' numbers and continually analyzing the level of toxins in their blood can we avoid that."

OCTOBER 16 — While I'm standing in front of the hotel waiting for the shuttle bus that will take me to Harlingen Airport, a female peregrine comes ripping over the top of a nearby high-rise hotel. She turns over and makes a vertical dive into the small field of dune grass between the two buildings. Through my binoculars I can see her stoop repeatedly at a small bird. Each time the bird sidesteps her attack, the falcon pulls out of the dive and lets her momentum carry her almost back to her former altitude. Finally, the small bird gets safely into some shrubbery that surrounds the hotel. The falcon barely misses slamming into the side of the building as she pulls up. She lands on the hotel roof and starts preening her flight feathers. Suddenly I'm aware of a van parked next to me with its driver honking the horn. I take a final look at the falcon, still perched on the hotel, as we drive away to the airport. ■

SPECIAL PULLOUT SECTION

BIRDSCOPE

The newsletter of the Cornell Laboratory of Ornithology ■ Volume 6, Number 3 ■ Summer 1992

TIM GALLAGHER

Volunteers for Ornithology: The Next Generation

Rick Bonney

New grant will encourage public participation in ornithology research

Encouraging and supporting volunteer participation in ornithological research is one of the main objectives of the Lab of Ornithology. Therefore, we are delighted to announce the receipt of a National Science Foundation (NSF) grant to improve our abilities to involve the public in scientific investigation. Called "Public Participation in Ornithology: An Introduction to Environmental Research," the grant will provide $759,269 over the next three years to evaluate and improve our radio program, BirdWatch; to evaluate and improve Project FeederWatch; and most exciting of all, to develop a brand-new educational program called the National Science Experiment, which is modeled on FeederWatch.

The new grant comes from the NSF informal science education program, which supports projects that involve broadcasting, science museums, nature centers, science clubs, and other community-centered activities. Of particular interest to this program are opportunities for both children and adults to acquire science literacy and awareness while satisfying natural curiosity. The National Science Experiment should fill the bill nicely.

The idea for the National Science Experiment grew out of months of discussion among the grant's three principal investigators: Charlie Walcott, executive director of the Lab; Rick Bonney, director of education and information services, and Greg Butcher, director of bird population studies. Walcott, an expert in informal science education, had been pondering national concern for both the poor condition of science education and the effects of humans on the environment. One approach for addressing both concerns simultaneously, he mused, was to provide the public with the opportunity to participate in real environmental research. With this approach the Lab could achieve two ends: it could teach people how science is conducted, thereby increasing their understanding of science, and it could promote public awareness of environmental issues.

Ornithology lends itself well to this concept. First, a large percentage of the public is seriously interested in birds. According to the U.S. Fish and Wildlife Service, 84 million Americans feed birds each year. That's approximately one out of every four people in the country. Second, public participation in ornithology is welcomed by professionals in the field, because many important projects could not be accomplished without massive volunteer help. Finally, people who become excited about birds and get involved in data-collection projects typically become interested in more general environmental issues. Curiosity about birds usually leads to numerous questions: Where do birds live? What do they eat? Why are more (or fewer)

The Fuertes Directorship: An Endowment Built on Friendship

The Lab of Ornithology announces the Louis Agassiz Fuertes Directorship, a new endowment in support of the Lab's executive director. This directorship was made possible by a lead gift from Imogene Johnson, longtime Lab friend and administrative board member. Imogene's generosity inspired gifts from several other Lab friends and a group of anonymous Cornell friends who together have fully funded this $3 million endowment.

The directorship is named in honor of Louis Agassiz Fuertes, the preeminent bird artist whose superb works are on permanent display at the Lab. This endowment is the second milestone in the Lab's capital campaign—the first was the Edwin H. Morgens Profesor of Ornithology, which was announced just this past March.

The Fuertes Directorship is born out of family friendship. Imogene's grandfather-in-law, Professor Olaf Brauner, was a landscape artist and one of Fuertes's teachers. Fuertes took the Brauner family birding, encouraging them to bring sketch pads and teaching them song identification skills. Thus began a lasting friendship between the Fuertes, Brauner, and Johnson families. According to Imogene, "Louis was a great man in his enthusiasm for everything he did. He loved birds and animals. He had many, many friends, an infectious sense of humor, and a wonderful way with children."

We extend our thanks to Imogene Johnson, her family, and the many other Lab friends who have made the Louis Agassiz Fuertes Directorship a reality. What started as a friendship has culminated in a celebrated and enduring leadership position for the Lab.

Scott Sutcliffe

Scott Sutcliffe, General Director

birds visiting our feeder this year than last? Answers to such questions quickly lead bird watchers deep into the thickets of concern about conservation and the environment.

The actual National Science Experiment, devised by Butcher and Bonney with help from the Lab's administrative board, will involve bird watchers throughout the country. Participants will engage in a series of guided activities aimed at answering specific questions about ornithology and also teaching scientific methodology. The first three questions most likely will be 1) do ground-feeding birds exhibit regional preferences in foods at feeders?, 2)in what months do rock doves (pigeons) living in cities breed, and which months are the most productive?, and 3) what is the smallest size of forest fragment in which each of the tanager species can breed?

These questions were selected because they represent a range of activities that can be undertaken by diverse audiences, from those with simple bird-watching skills to those having the more complex knowledge required to recognize birds by their vocalizations; because they involve activities that can be undertaken both in the city and the country, during both winter and summer; and because they are questions for which clear answers should result from a single season of investigation. In addition, the tanager habitat project should provide data relevant to neotropical migratory bird conservation (see "Save Now or Pay Later" in the Summer 1992 issue of *Living Bird*).

The National Science Experiment is the next logical step in a long tradition of amateur involvement

Participants in each of the experiments will include members of bird clubs, nature clubs, urban groups, scout groups, 4-H clubs, and the like. Organizations that have already agreed to cooperate include the National Audubon Society, National Wildlife Federation, American Birding Association, Roger Tory Peterson Institute, Wisconsin Society for Ornithology, New Jersey Audubon Society, Cornell Cooperative Extension of New York City, and the American Association for the Advancement of Science. The two latter organizations should be particularly helpful in inaugurating our pigeon-watching project in cities, where few environmental education programs have ever been attempted. In addition, the U.S. Forest Service and the U.S. Fish and Wildlife Service have agreed to help us perform the tanager experiment on public lands.

The National Science Experiment will be conducted in stages. During the first year, we will bring together leaders of cooperating organizations to develop prototype experimentation methods. We will also test the experiments with small groups of observers and modify the experimental design based on the field trials. During the second year, we will run the experiment with all interested participants. In the third year we will analyze the results, report back to the participants, and evaluate the project to determine its success and to decide whether we should continue the experiment with new scientific questions.

Evaluation will proceed along two fronts. First, we will measure the number of participants to see whether such an effort can attract a wide audience. Second, we will survey a sample of the audience to determine the effects of participation. Will participants change their perceptions of both science and ornithology? Will involvement in research have a stronger effect on the participants than, for example, passive viewing of an educational program or exhibit, and if so, in what ways?

Walcott, Bonney, and Butcher feel that the National Science Experiment is the next logical step in a long and valuable tradition of amateur contributions to the science of ornithology. We hope that all interested individuals and organizations will join us as we embark upon this unique project.

BILL DYER

BPS Gets Tanager Grant

The Lab's Bird Population Studies program (BPS) has been awarded a grant from the National Fish and Wildlife Foundation for an innovative survey of tanagers in North America. Called "Tanagers in Forest Fragments," the project is part of the Partners in Flight Neotropical Migratory Bird Conservation Initiative. Grant funds will supplement the Lab's award from the National Science Foundation (above) for three National Science Experiments.

BPS will call on the expertise of bird club members across the country in an effort to monitor four species of tanagers—scarlet, hepatic, summer, and western—during the breeding season. "These tanagers are neotropical migrants," says BPS director Greg Butcher, "and other studies have shown that scarlet tanagers are sensitive to forest fragmentation. Furthermore, a recent analysis of Breeding Bird Survey data shows scarlet tanager numbers have declined significantly over the past 10 years. We think forest fragmentation is the problem, and we predict that all four species of tanagers are much more likely to breed in large forests—say 1,000 hectares or more—than in smaller forests." A small army of citizen birders—Butcher hopes to enlist at least two bird clubs in each of the lower 48 states—will test this hypothesis.

The project will also call on a variety of agencies and organizations that are involved with Partners in Flight, including the U.S. Forest Service, state parks and forests, The Nature Conservancy, the forest products industry, and others, to identify forest fragments of various sizes. The $110,000, one-year grant consists of a $45,000 award and $65,000 in challenge funds. "We'll be looking for corporate and foundation support," says Butcher, "and we expect this will ultimately be a three-year project." Other Lab departments will assist BPS in producing a tape of tanager vocalizations, a tanager identification poster, and other educational aids for project participants.

Butcher says BPS originally considered wood pewees as the subject of this study. Why did they go with tanagers? "One of the four tanager species breeds in each of the lower 48 states, so everybody lives pretty close to a breeding tanager," says Butcher. "Besides, they're so colorful."—*C.B.*

TIM GALLAGHER

Profile: Scott Sutcliffe

When Scott Sutcliffe was 6 years old, his grandfather gave him a copy of the Cornell Lab of Ornithology's first bird song record, *Songbirds of America.* "I was already a bird enthusiast, so it was a great present," Scott remembers. "Right then and there I promised myself, 'I'm going to go to Cornell University, where they made that.'"

A few years have gone by, and Scott's wish has come true . . . twice! How did it happen?

"In high school I was more interested in cars than birds," he admits. "But one day, my parents dragged me away from the Volkswagen bug I was rebuilding and took me to Manomet Bird Observatory, where they'd been volunteers. I got hooked. I was Manomet's first student intern."

From there, Scott earned a B.S. in wildlife ecology at Cornell (the first granting of his childhood wish), then went off to watch loons for the summer on behalf of the Squam Lakes Association. That summer job inspired him to enroll at the University of New Hampshire, in the Institute of Natural and Environmental Resources, where he earned a master's degree in "loon-ology." "I was the only nongame bird person in the whole institute," Scott says, "but I converted them."

While attending UNH, Scott headed the Loon Preservation Committee of the Audubon Society of New Hampshire, a volunteer-based loon survey and recovery program. At the same time, he helped found the North American Loon Fund, a membership organization that promotes loon preservation by funding research, education, and management programs.

"We called ourselves the loon rangers," says Scott of his Audubon work. "We'd go 'dock-knocking,' teaching the people who lived on the lakes, in a friendly way, what they could do to help their loons. And our program really worked. From 1975 to 1990, the number of adult loons in New Hampshire more than doubled."

But despite the satisfactions of his loon-atic lifestyle, Scott decided he needed a change. So he took a job as director of the Long Island chapter of The Nature Conservancy (TNC). "It was culture shock: moving from New Hampshire to Long Island. But I loved the work, because I really support TNC's goals: to identify, protect, and manage critical habitats."

Fate, however, hadn't yet completely fulfilled its plans for Scott Sutcliffe. In 1985, the Lab of Ornithology recruited him away from TNC to come to Sapsucker Woods as director of public affairs. So he came to Cornell—again.

Even though the job initially had some disadvantages—his first office was in a converted hallway—Scott was impressed by the professionalism of the Lab staff and the potential for growth. In 1991, Scott became the Lab's general director.

"The best thing that's happened since I came to the Lab," says Scott, "is the work we've done to focus our mission: who we are and what we want to accomplish in bird study and conservation. We have a talented and dedicated staff and an excellent board of directors—it's great working with them."

His vision for the future? "I'd like the Lab to be the premier bird institute in North America. Any time anyone sees a bird, anywhere, I want them to think 'Cornell Lab of Ornithology—providing the tools for bird research and conservation.'"

Even though the license plate on Scott's car (it's a Volkswagen, by the way) still reads "LOONS," and even though a hand-carved loon graces the comfortable office he now occupies, Scott says they're not his favorite bird. "Loons are a touchstone," he explains. "They're mysterious, they're beautiful, and they symbolize the wilderness they inhabit. Get people excited about loons, and they'll want to protect the lakes that loons depend on.

"It's the same way with birds in general, only we're looking at the big picture. If we care about birds, we'll protect all the resources birds rely on—and ultimately our planet." —*C. B.*

Big BirdWatch '92: A Record-Shattering Day for the Sapsuckers

The Sapsuckers returned from New Jersey's World Series of Birding last month with some amazing news: not only did they log in 184 bird species in 24 hours, shattering the all-time Sapsucker big day record by 11 birds, but they also raised more money than anyone had even remotely imagined. Over $48,000 has been raised to date, all from the dimes, quarters, and dollars pledged by our members and friends.

How did the Sapsuckers improve their score? Mostly by spending a lot more time scouting New Jersey before the event than they had in previous years. A full two weeks before the event, Cornell grad student Ned Brinkley was already there, checking key areas and camping out in places with night bird activity. The rest of the team—Tim Gallagher, Todd Culver, Kevin McGowan, and Ken Rosenberg—joined Ned a week later and spent the next five days birding from 5:00 A.M. to midnight.

The big day plan seemed so simple; but who could have predicted that a storm would hit the day of the event. Daybreak found the Sapsuckers standing in a driving rain in the middle of a marsh. But worse was to come: At Brigantine an afternoon fog obscured many birds. Still, the Sapsuckers hung tough and though they didn't win the World Series of Birding, they achieved a score to be proud of.

We'd like to thank all of you who supported Big BirdWatch '92 through your pledges and made the event such a success. And also a special thanks to Ford Motors, who lent the Sapsuckers a four-wheel-drive Explorer to drive in the event.

TIM GALLAGHER

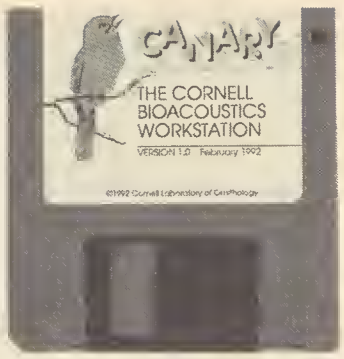
The Sapsuckers in action on Big BirdWatch Saturday.

The Canary Sings!

It's a Bird . . . It's a Disk . . . It's New Sound Analysis Software

The Lab's Bioacoustics Research Program (BRP) has released a new computer software program for analyzing natural sounds. Called "Canary," the Macintosh-compatible program transforms recorded sounds into data files that can be displayed as spectrograms, then edited, compared, and interpreted. The development of Canary was funded by an $82,000 National Science Foundation grant and matching funds raised by the Lab.

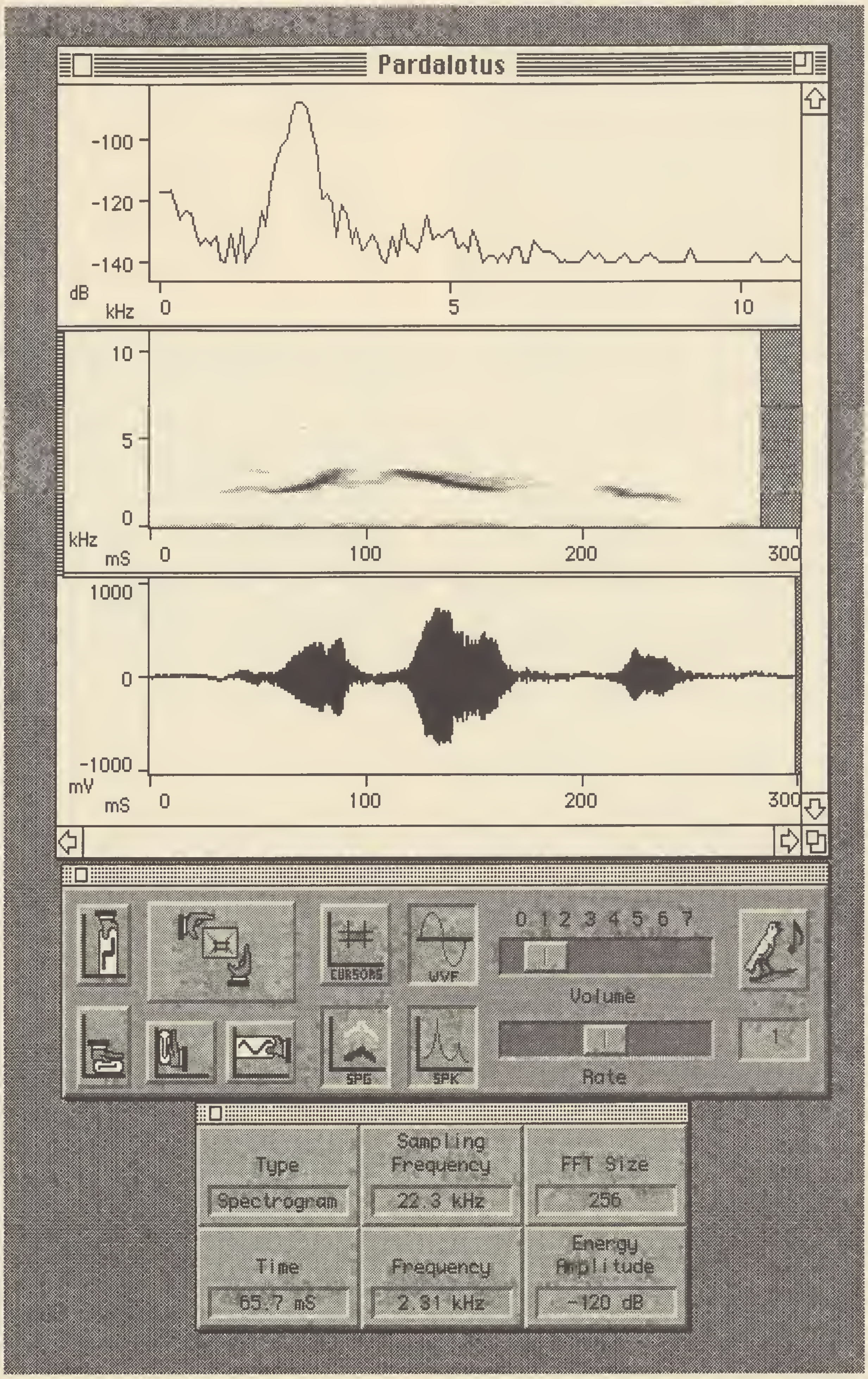
"The bioacoustics research community has a real need for a sound analysis program that's user friendly but also has sophisticated analytical capabilities," says BRP director Christopher Clark. "Canary is both, and it runs on a moderately priced computer system that many researchers already have in their labs."


CANARY
THE CORNELL BIOACOUSTICS WORKSTATION
VERSION 1.0 February 1992
©1992 Cornell Laboratory of Ornithology

According to Clark,most of the sound analysis systems now in use have been adapted from industrial or medical applications. "Bioacousticians have been forced to analyze animal sounds using less than optimum parameters," he says, "simply because that's how these instruments are set up—to measure the human voice or the sound of worn-out ball-bearings." Canary has a whole continuum of settings available, so researchers can tailor each analysis for the sound spectrum of the animal being studied.

BRP programmer Steve Mitchell, who wrote the program, demonstrated Canary's capabilities for Lab staffers at a recent meeting. First recorded sounds are converted to data files; then the computer screen displays a window with as many as three sections that show a sound's waveform, spectrogram, or spectrum. A command panel controls the display scale and playback volume, while a measurement panel lets the researcher quantify parameters of the sound. Two sounds can be viewed and compared simultaneously.

Researchers can put Canary to work in their labs for a small fee. The $200 purchase price covers future upgrades, including a user manual, on-line help, and tutorials. "That's our immediate next project," says Clark, "developing these materials to make the program even easier to use." BRP is also planning an advanced version of the program for the Cornell bioacoustics research community.



Type	Sampling Frequency	FFT Size
Spectrogram	22.3 kHz	256
Time	Frequency	Energy Amplitude
65.7 mS	2.31 kHz	-120 dB

Making sense of sounds: Canary displays three aspects of this Australian bird's song simultaneously.

Erratum

The photograph of Greg Budney on page 2 of the Spring 1992 issue of *Birdscope* was credited incorrectly. The photographer's name is Robert I. Bowman.

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The Golden-cheek and the Ghost Subdivision

by Mel White

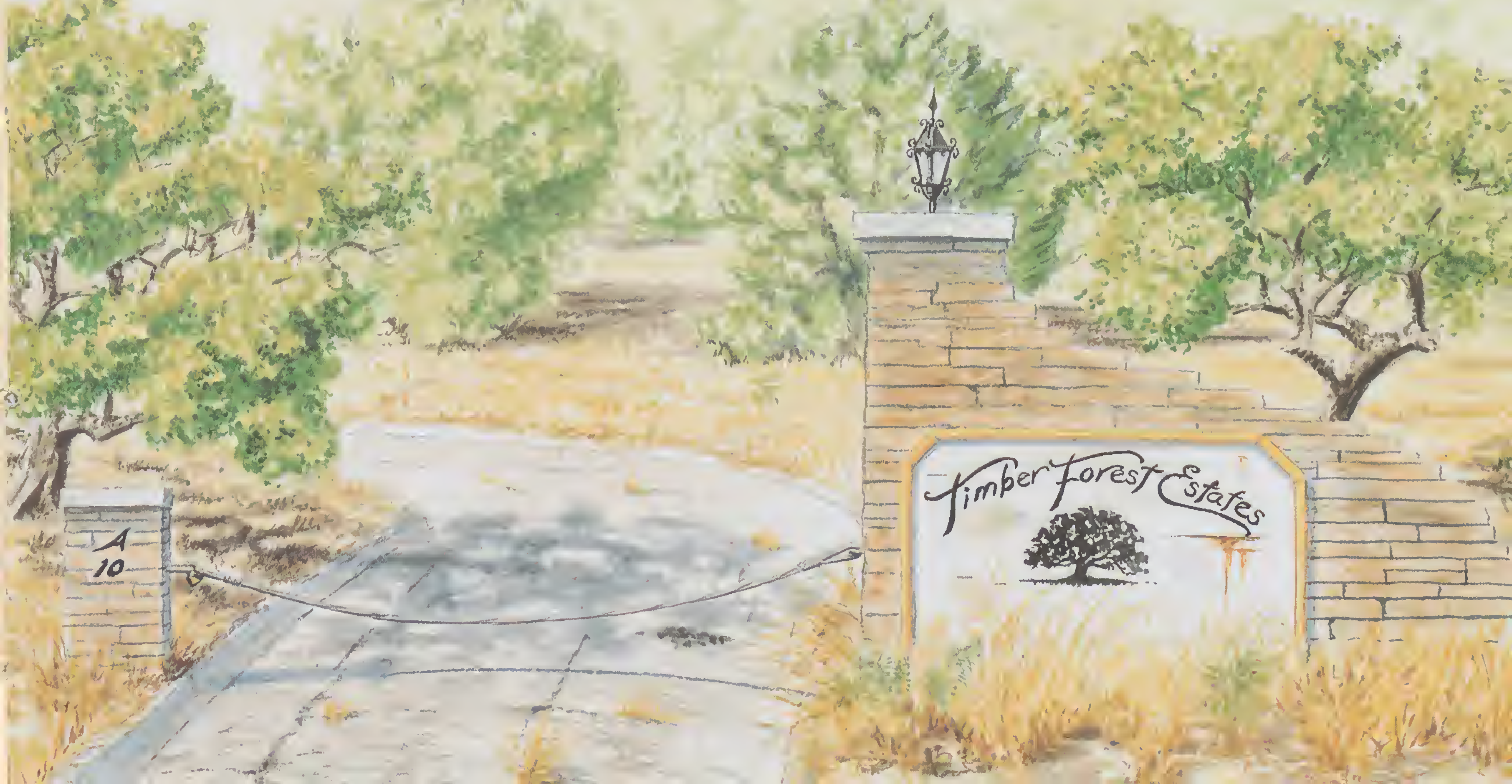
As housing developments go belly up in the Texas Hill Country, a threatened warbler gets a reprieve

I've lived in Arkansas my whole life, but since I started birding my second home has been the quasi-independent nation-state of Texas, which sprawls just on the yonder side of Texarkana and which, in a happy convergence of biology and psychology, is as full of birds as it is of itself. If I manage to be on the road around daybreak, by midafternoon I can be watching black skimmers incise a Gulf Coast bay, or scanning a marsh for roseate spoonbills. A cheap airline ticket quickly puts me at the Harlingen airport, a few minutes from green jays and blue buntings. These are tempting possibilities when a holiday weekend approaches.

As most birders do, I've concentrated on the fringes of the state: the coast, the lower Rio Grande Valley, and the Big Bend. Until recently I'd never spent any time in the Texas Hill Country west of Austin and San Antonio. This meant that I'd never seen a golden-cheeked warbler, since the Hill Country is the only place in the world where it breeds. (Neither had I been to the mountains of Central America to see it on its wintering grounds.) Last spring I had a chance to visit the Austin area, and it seemed an appropriate, if gloomy, time to make this little bird's acquaintance. In 1989, the U.S. Fish and Wildlife Service, in a special emergency ruling, declared the golden-cheek an endangered species.

Golden-cheeked warblers require a very specific habitat: hilly country with mixed woodland that includes mature Ashe juniper trees. The birds use strips of bark from the juniper (which most Texans call "cedar") in their nests. Unfortunately for the golden-cheek, our own species finds the Hill Country appealing, too. The rolling landscape west of the Balcones Fault, which separates the hills from the Gulf Coastal Plain of east Texas, has a rough beauty that attracts resorts and retirement communities. Hill Country rivers like the Guadalupe and the Colorado have been dammed, creating popular recreational lakes but flooding habitat. Land-clearing for agriculture and ranching has destroyed extensive

ILLUSTRATIONS BY JOHN SCHMITT



areas of native woodland. In addition, Austin was one of the country's true boom towns in the early 1980s; the success of high-tech industries created phenomenal growth, much of which took place in the hills to the west of town—important golden-cheek habitat.

No one knows exactly how many golden-cheeked warblers are left; estimates vary from 4,000 to 15,000 breeding pairs. What is known is the extent of habitat destruction: in the past decade alone, 40 percent of the land suitable for golden-cheeks has been lost in the heart of their range. Equally ominous, most of the remaining habitat is in counties that are becoming urbanized. The golden-cheek, with a true claim to being a native Texan, is in danger of finding itself without a home.

It didn't take long, once I was in the Hill Country, to find a graphic example of the problems facing the golden-cheeked warbler. Late one Saturday in March I left Interstate 35 north of Austin and drove south on Highway 620, which skirts the city to the west. On the map, 620 looked like a country road, but it turned out to be a four-lane freeway lined with subdivisions, all of obviously recent origin and many in what looked to me like good oak-juniper woods. And then something else become obvious: for every subdivision or "business park" up and running, another had stalled on the starting line. There would be a fancy entrance gate with a logo—something like "Timberforest Woods" or "Mountainhill Ridge"—with a steel cable across the entry and weeds growing up through the driveway. And—oh, yes—a "For Sale" sign.

What I was seeing was a true interface between money and the environment. Back when Austin was booming, high-rolling developers wore blisters on their fingers signing loans and playing "Let's Make a Deal" with other people's money. When the real-estate bubble burst, a lot of people were left with "luxury homesites" that nobody wanted. Multiply this a few hundred times, and Texas savings-and-loans starting going belly up faster than dime-store guppies. (And quite a few people who drove Porsches and wore $1,200 suits moved into what they call down here the crossbar hotel.) Bottom line, Austin isn't growing anymore and the golden-cheeked warbler has something of a temporary reprieve.

Which brings us to the Balcones Canyonlands Conservation Plan, a historic attempt to reconcile the needs of endangered species with a community's inevitable growth. Conservationists, developers, and government officials have been working together since early 1989 to set aside critical Hill Country habitat in contiguous blocks through one master plan, rather than piecemeal, parcel by parcel. The goal is to protect the golden-cheeked warbler (and several other endangered species, including the black-capped vireo) and at the same time ease environmental restrictions on future land developers. Upwards of 70,000 acres could be protected under such an agreement, much of which would be included in a new refuge called the Balcones Canyonlands National Wildlife Refuge northwest of Austin. It has been a long, hard process of conflict and compromise, but if a habitat plan is approved by all the participating agencies, it could set an important precedent for dealing with issues of development and preservation.

If the conservation plan succeeds, it may be in part because a good deal of important habitat is now owned by the federal government—more specifically, by the Federal Deposit Insurance Corporation (FDIC) and the Resolution Trust Corporation (RTC). These agencies took over land from failed financial institutions, and, in one important way, they have an incentive to cooperate by seeing some of that land set aside for wildlife. If a habitat plan is put into place, development outside conservation areas will be much easier, making land worth more and increasing the value of the remaining FDIC and RTC holdings. Thanks to the massive scale of bank and savings-and-loan failures, there's plenty to work with; at one point after the bust an Austin newspaper reported that as much as seven percent of Travis County (Austin's home county) was owned by either the FDIC or RTC. Serious negotiations are already under way for The Nature Conservancy to buy 9,600 acres of RTC land.

After I'd been on Highway 620 for some time, and after passing innumerable developments both active and defunct, I decided to do a little exploring. Choosing more or less at random, I turned off the highway onto a woods-lined road heading west, and then parked. This was a broad new street, paved and curbed; cleared corridors with flagged wooden stakes branched off from each side. Obviously these were intended to be secondary streets, but they led nowhere. Weeds and scrub choked the rights-of-way. A Bewick's wren sang. The wind rustled the trees. A "black-crested" titmouse scolded, and a scrub jay popped up to see what was going on. Green Acres.

I walked down one of the cleared paths, which paralleled a steep, wooded ravine. I didn't know exactly where I was going, but this habitat looked good; it certainly had plenty of junipers mixed with the oaks. A black-and-white warbler sang from somewhere off the road, but not much else was active. After 20 minutes I had just

about decided that it was too cloudy, too late in the day, when I heard a distant buzzy song that sounded a little like a black-throated green warbler—just what I'd been listening for. I kept going down the path.

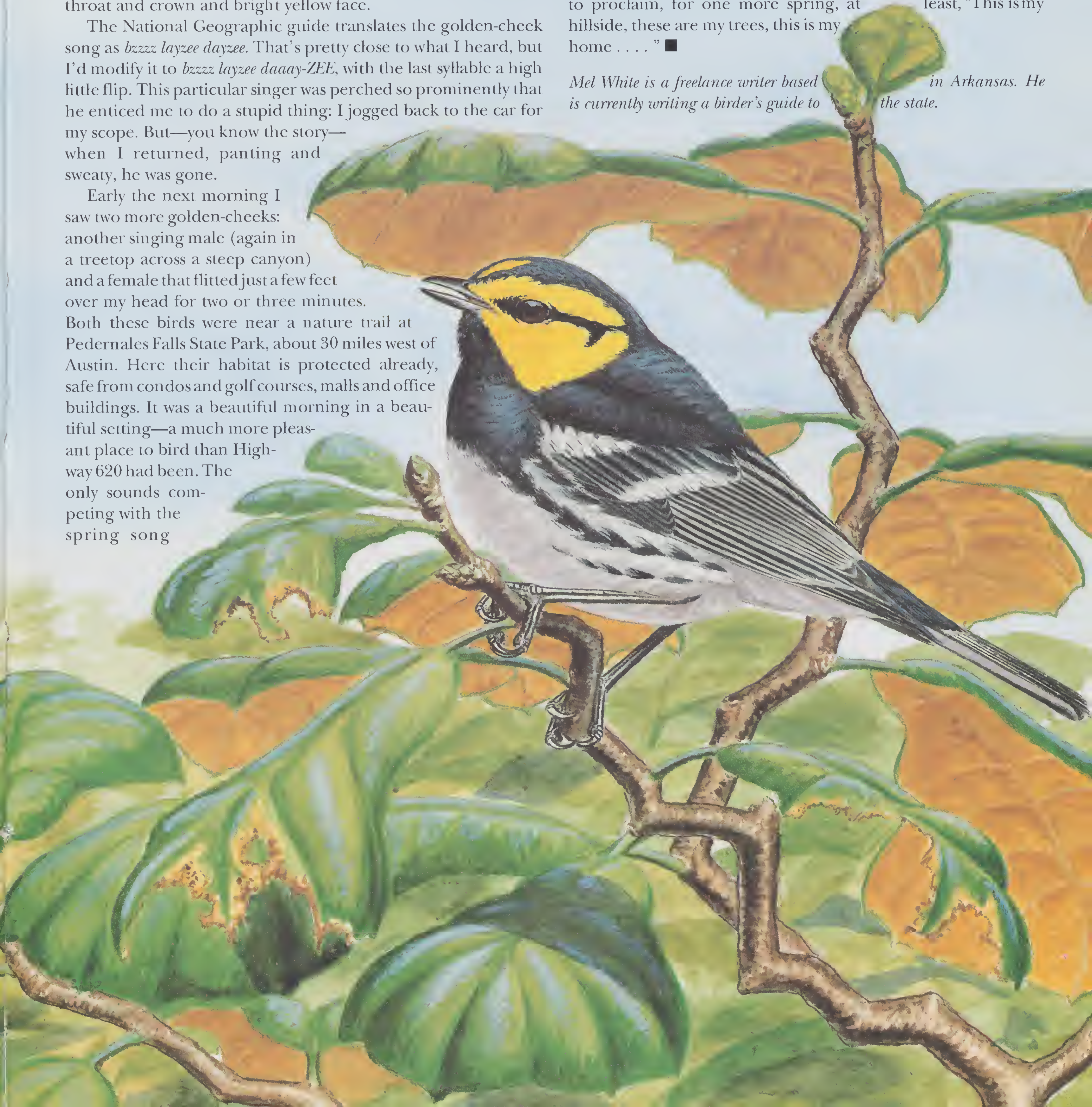
The song repeated at frustratingly long intervals, but eventually I homed in. If it was a golden-cheek, it was right where it ought to be, on the edge of a rugged, tree-filled canyon. Unfortunately, I was on the wrong side. I considered my options, then tried the birder's desperation maneuver: I started scanning with my binoculars. And I found him. He was claiming his territory from the top of a tree at eye level across the ravine, just about at the limit of binocular recognition. Nonetheless, I could see his black throat and crown and bright yellow face.

The National Geographic guide translates the golden-cheek song as *bzzzz layzee dayzee.* That's pretty close to what I heard, but I'd modify it to *bzzzz layzee daaay-ZEE,* with the last syllable a high little flip. This particular singer was perched so prominently that he enticed me to do a stupid thing: I jogged back to the car for my scope. But—you know the story—when I returned, panting and sweaty, he was gone.

Early the next morning I saw two more golden-cheeks: another singing male (again in a treetop across a steep canyon) and a female that flitted just a few feet over my head for two or three minutes. Both these birds were near a nature trail at Pedernales Falls State Park, about 30 miles west of Austin. Here their habitat is protected already, safe from condos and golf courses, malls and office buildings. It was a beautiful morning in a beautiful setting—a much more pleasant place to bird than Highway 620 had been. The only sounds competing with the spring song were the rush of the Pedernales River and the splash of a small waterfall on the creek below me.

To tell the truth, though, I'm glad I saw my first golden-cheeked warbler where I did. I have no idea whether his suburban canyon will ever be preserved; someday, one of his descendants may return from its wintering grounds in Central America and find bulldozers at work again. But I'll always remember walking down that abandoned road and hearing him singing from a treetop, a symbol of . . . well, of a great many things, including the Texas conservationists fighting for him and his kind. With so many battles for habitat going on all over the world—and so many being lost—it's good to think of this tiny bird able to proclaim, for one more spring, at least, "This is my hillside, these are my trees, this is my home . . . . " ■

Mel White is a freelance writer based in Arkansas. He is currently writing a birder's guide to the state.



JOHN ALCOCK

The Birds and the Damselflies

by John Alcock

Comparing birds with insects is one way to learn the facts of life

An Abert's towhee bounces nonchalanly onto our back patio and takes three hops forward. Its partner promppromptly mimics its actions, jumping up onto the patio and skipping close to the the lead bird with three hops of its own. The first towhee then scampers ahead, stopping to send the leaf litter flying by the edge of the patio. The second bird immediately follows suit, joining its companion for a brief bout of foraging. Soon the first towhee stops and flutters on brown wings into a tangerine tree, with the other bird right behind, as if it were physically attached to its partner.

It is the breeding season for Abert's towhees in central Arizona, and the pair on our patio has just built a nest nearby. They are now inseparable, moving everywhere in tandem, exhibiting mutual "devotion" reminiscent of a pair of mute swans cruising sedately shoulder-to-shoulder across an English pond.

In attempting to account for the exceptionally close partnerships found in pair-bonded Abert's towhees, mute swans, and breeding birds generally, students of animal behavior had reached a consensus by the 1960s and 70s. The prevailing view then was that close interactions between male and female promoted synchrony in their physiology and behavior, enabling them to cooperate efficiently as a monogamous duo in producing and rearing young.

This idea, however, has been challenged recently by proponents of a considerably more Machiavellian hypothesis. The new argument is that pairs are inseparable because the male is keeping an eye on his partner, the better to prevent her from copulating with some other male. Far from viewing close associations between male and female birds as a mechanism for reproductive cooperation between the sexes, the new hypothesis suggests that a male remains at his partner's side to shield her from rival males and, if this fails, to be in position to quickly remove or dilute sperm that she receives from other males. These actions help the male to fertilize more of his potentially "unfaithful" partner's eggs.

This hypothesis draws strength from an avalanche of studies in the past decade that document "infidelity" in what were once thought to be faithfully monogamous birds. For example, the new technique of DNA fingerprinting has established beyond doubt that female purple martins, zebra finches, and indigo buntings (to name a few) regularly produce broods that have more than one father (see "When Monogamy Isn't," Summer 1990).

Thus the current school of thought among ornithologists is that male behavior in many species is designed primarily to protect the male's paternity. The mate-guarding hypothesis can be tested in a variety of ways. If it is true, then we can predict that male birds will remain in particularly close company with their partners during that time when their mates are producing eggs that can be fertilized. This prediction has been tested by Stephen Emlen and Peter Wrege of Cornell University in their studies of the white-fronted bee-eater, an African species that forms large nesting colonies in exposed clay or sand banks. At the nesting sites, gravid females can be easily detected by dozens of males, some of which are prepared to race after these females, attempting to force them to copulate—attempts that are occasionally successful. But during the week or so when a female's eggs can be fertilized, her male partner almost invariably flies after her whenever she leaves the nest tunnel. When rival males swoop down to try to knock the female to the ground, her partner is there to intercept his opponents in an aerial dogfight that usually enables his female to avoid an extra-pair copulation (or EPC, as it is known to acronym enthusiasts).

As soon as their female partners have no more eggs to lay, however, the very males that have been accompanying their mates everywhere often begin to pursue other females that still have fertilizable ova. Thus, bee-eater males are both devoted monogamists (when there is a large reproductive payoff from monopolizing the chance to fertilize the eggs of a partner) and opportunistic polygamists (when it is convenient to try to secure some extra egg fertilizations outside the pair bond).

The behavior of male white-fronted bee-eaters (and many other birds) is highly consistent with the mate-guarding hypothesis. But before we conclude that the hypothesis is definitely correct, let's double-check its validity in a way that takes us out of the realm of birds and into the world of insects. If the adaptive value of a close association between the sexes is to permit the male to monitor his mate's behavior and repel rival males, then the behavior should have evolved independently in animals unrelated to birds, *if* females of these other animals also sometimes mate with more than one partner.

Bird watchers can examine this proposition for themselves with little difficulty and much pleasure provided they are willing to set aside their binoculars and expand their observational horizons to include damselflies and dragonflies. These delightful insects have many parallels with birds. Not only are they colorful, visually oriented creatures, but their lives are consumed with sexual competition, competition that can be readily observed in most neighborhoods at a nearby stream or pond.

Thus, it is not necessary to travel to Kenya and find a colony of white-fronted bee-eaters (although few would object to such an excursion) in order to enjoy the drama of males competing to fertilize

Why does a male bird follow his mate everywhere? Is it to guard the female from the sexual advances of other males? Entomologist John Alcock invites birders to test this hypothesis by examining similar behavior in a group of insects—the damselflies. At left, male and female black-winged damselflies copulate in the characteristic "wheel" position.

JOHN ALCOCK(2)

Abert's towhee (above right), is just one of many species in which mate-guarding occurs. At left, a male black-winged damselfly guards his egg-laying partners from intruders. If another male succeeds in copulating a the female, the first male will extract some of the rival's sperm, then copulate with his mate again to dilute any sperm remaining. Above, the ultimate in mate guarding: this male damselfly hangs on while the female lays her eggs.

JOHN H. HOFFMAN

the same female's eggs. Consider the black-winged damselfly, *Calopteryx maculata*, a species distributed throughout eastern North America. The males of this gorgeous insect can be found perched at intervals along many small streams and brooks in the Northeast. There they guard territories from rivals and wait for females to appear at the stream to lay their eggs in vegetation barely submerged in water.

Before they oviposit, gravid females are almost always spotted by resident territory holders, which fly to them for a brief courtship and mating on stream bank vegetation. Copulation takes place in the peculiar fashion of dragonflies and damselflies. In this order of insects, the male transfers sperm from his testes at the tip of his abdomen to a "penis" equivalent called an aedeagus, which is located on the underside of his abdomen near his thorax. When the male grasps the female near her head with special claspers on the end of his abdomen, she must swing the tip of her abdomen around to reach the male's aedeagus, forming the characteristic "wheel" position made by copulating dragonflies and damselflies.

After copulation is complete, the male releases the female and she flies to the water to begin laying her eggs. Although the male black-winged damselfly is no longer in physical contact with his mate, he perches close by, keeping her very much in view. When an intruder male approaches—a frequent occurrence in many populations—the resident male darts off his perch. In a brilliant demonstration of aerial maneuverability, he weaves back and forth between the rival and his egg-laying partner, attempting to force the other male away in a fashion rather like male white-fronted bee-eaters.

If male black-winged damselflies are in fact engaged in adaptive mate-guarding, then it follows that unguarded females must sometimes copulate with a male other than their current partner. And they do. On occasion, particularly when a territorial male is simultaneously guarding several egg-laying mates, a group of intruder males launches a combined assault. While the resident chases one rival away, others chivvy ovipositing females up into the streamside vegetation. The females mate with the interlopers before returning to lay more eggs. Much the same thing occurs on occasion in white-fronted bee-eaters: groups of males overcome the defenses of a guarding male, driving the female to the ground. There she may be pounced upon and mated by one or more of her pursuers, apparently against her will. In both bee-eater and damselfly, the presence of a guarding partner reduces, but does not completely eliminate, the possibility that their mates will experience presumably unwanted EPCs.

Therefore, in some birds and some insects, a male may secure a partner that has copulated with rival males. Under these circumstances, the male that could prevent his mate from using the other males' sperm to fertilize her eggs would seem to enjoy a reproductive advantage. But how could this happen once an EPC has occurred?

Studies of the European dunnock by the British ornithologist Nicholas Davies and his colleagues have generated some exciting discoveries on this front. Davies began to investigate the behavior of this extremely drab, sparrow-like bird some years ago, at a time when it was thought to be a typical monogamous bird. In fact, the dunnock's apparent ordinariness was specially singled out for praise by the Reverend F.O. Morris in 1856: "Unobtrusive, quiet and retiring, without being shy, humble and homely in its deportment and habit, sober and unpretending in its dress, while still neat and graceful, the dunnock exhibits a pattern which many of a higher grade might imitate . . . ." As Davies points out, it is just as well that the good reverend did not know about the sexual shenanigans of many dunnocks.

BHL

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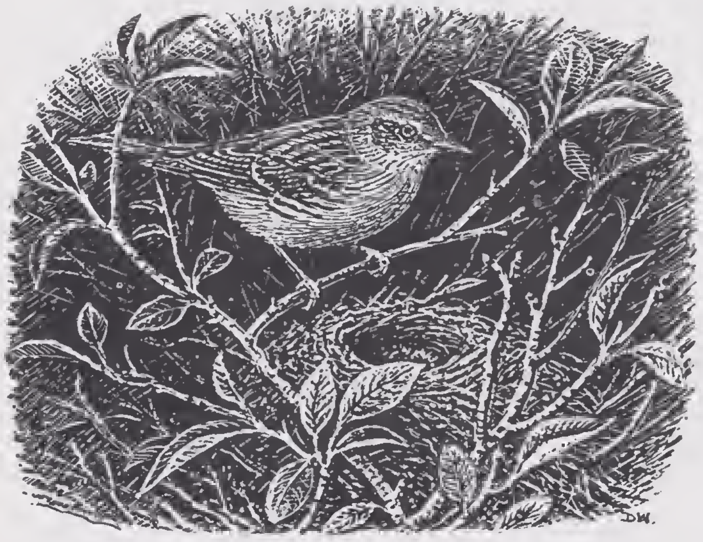


Although the dunnock (above) was admired by a 19th-century clergyman for its sober, retiring deportment, the bird's true story is rather more racy. If a male loses track of his mate temporarily, she will cooperatively copulate with another partner. Can the first male do anything about it? Yes—he uses the same strategies as a male damselfly, sperm extraction and sperm dilution.

Careful observation of color-banded birds revealed, for example, that some pair-bonded females develop a voluntary sexual relationship with a second male. This male is cautiously co-resident on the female's territory with a dominant (or alpha) male, which often attacks the second (beta) male. Even so, the beta male regularly attempts to copulate with the female, and he sometimes succeeds, particularly when the alpha male happens to lose track of his partner temporarily. Under these circumstances, the female usually makes no effort to assist the alpha male as he searches for her ("frantically," according to Davies) but instead copulates with the beta male.

Given that the female may have acquired sperm from his rival, can the alpha male do anything about it? The answer appears to be yes. When an alpha male of the not-so-humble dunnock discovers a beta male in flagrante delicto with their mutual partner, he typically attacks the beta male and then pecks at the female's cloaca, the opening to her reproductive tract. In response to the pecks, the female dunnock may void a droplet of fluid from her cloaca—fluid that contains active sperm, presumably those of the beta male. The alpha male usually concludes a bout of cloaca-pecking by copulating one or more times with his partner. By donating a considerable quantity of his own sperm, he may swamp any beta sperm still remaining within his partner.

As we did in examining the adaptive value of mate-guarding, we can test the hypothesis that male dunnocks promote their reproductive success through "sperm dilution" matings by predicting that in other birds *and in insects too* males with multiple-mating partners will exhibit similar responses. In keeping with this prediction, male mallards typically copulate with their partners immediately after the female has been subjected to EPCs by gangs of rival males, which sometimes overwhelm the male's mate-guarding capacity. This response enables the pair-bonded male to put his sperm at once into the race to fertilize an egg. Similarly, male goshawks copulate at higher-than-average frequency when they return to their mates after a longer-than-average absence, presumably to swamp any sperm their females may have received from intruders in the interim.

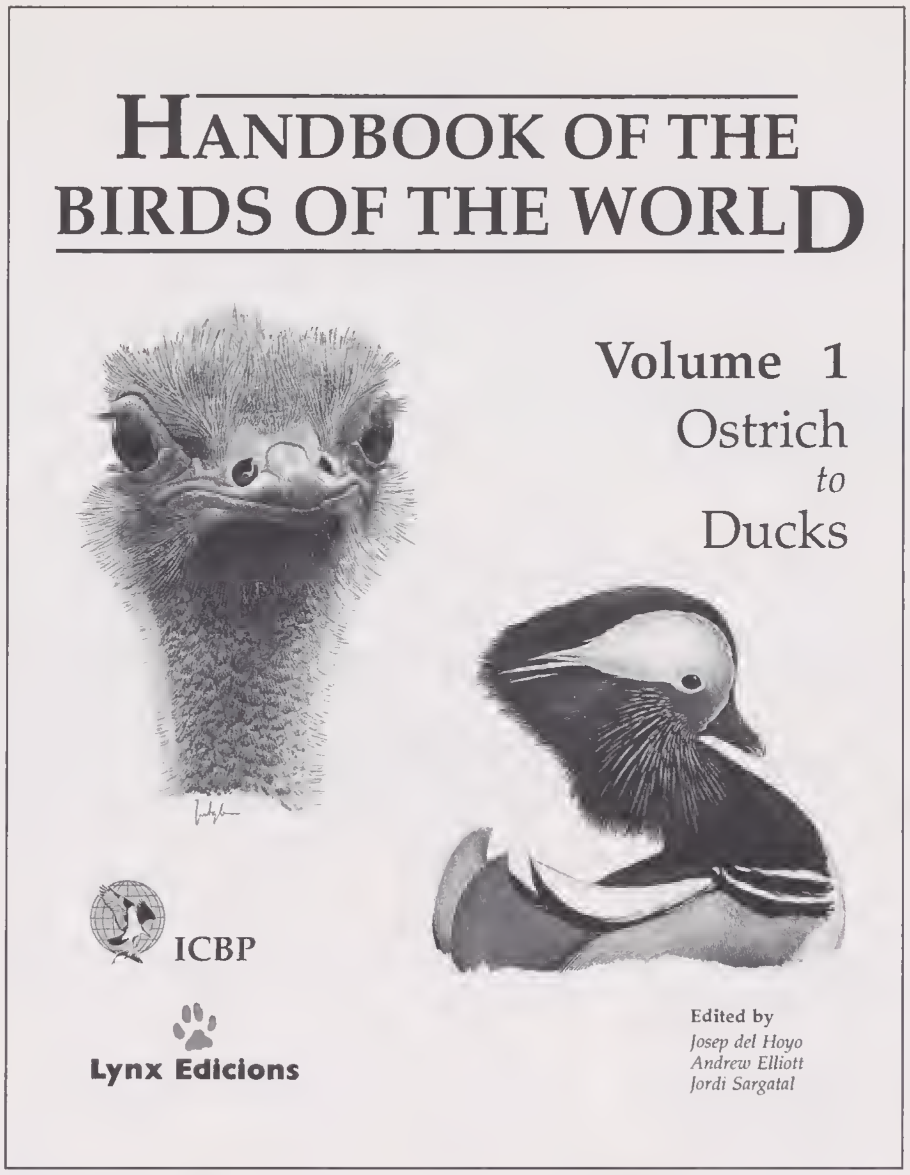
Returning to insects again, we have seen that male black-winged damselflies, like male dunnocks and mallards, run the risk that their partners may mate with other males. Against this risk they have evolved counter-responses that are wonderfully similar to those employed by dunnocks. Guarding male damselflies that have been under heavy pressure from intruders sometimes fly at and land on the wings of the egg-laying female(s) in their territory. If a female responds by flying up to a perch, the male will follow and copulate with her again before resuming mate-guarding. These copulations, like those of harassed alpha male dunnocks and paired mallards, appear to be sperm-dilution matings.

The convergence in behavior between damselfly and dunnock extends to sperm-removal as well as sperm-dilution. Jon Waage of Brown University discovered that the male black-winged damselfly extracts most of the sperm that a rival has donated to his partner before transferring his own gametes. He does this in the first stage of copulation, using his aedeagus, which is armed with assorted spines and horns for the purpose. Only then does the male allow his own sperm to flow into his partner.

Therefore, in animals as different as birds and damselflies, the possibility that a mate will receive sperm from others has resulted in similar patterns of mate-guarding, sperm-dilution, and even sperm-removal tactics. Although many variations on these themes exist among the birds and damselflies, males of both species appear to have mechanisms designed to increase the probability that their sperm, not a rival's, will fertilize the eggs that a partner is about to lay. Among these competitive mechanisms is the close monitoring of females by their partners, who are indeed devoted to their mates—but primarily as a means of ensuring their fidelity.

It is true that this view of the relations between the sexes has an air of cynicism about it. But as someone who began bird watching at age six (first life bird, the EPC-prone mallard) and dragonfly watching about 30 years later, I find that it does not dilute my interest in Abert's towhees to think I know why males skip so energetically after their females. Nor is my appreciation of the aesthetics of black-winged damselflies impaired by recognizing that their behavior constitutes a test of the mate-guarding hypothesis. Monogamy may be largely dead (in dunnocks and damselflies) but happily, the romance of understanding a general pattern in nature lives on. ■

John Alcock is a professor of zoology at Arizona State University. Although he gave up ornithology as an academic career to metamorphose into an entomologist, he retains a fondness for birds. Alcock is the author of a number of natural history books that touch on bird behavior, including Sonoran Desert Summer *(University of Arizona Press, 1990).*



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CORNELL LAB OF ORNITHOLOGY
For the Study and Conservation of Birds

TIM GALLAGHER

WELCOME TO THE CLUB

by Jack Connor

Imagine that you are scanning the sky at your favorite birding spot when a man comes running toward you. You can tell at a glance he's a beginner. His binoculars are cheap, his boots are unscuffed, and his thumb is holding open the crisp, clean pages of a brand-new field guide. "Hey!" he shouts. "There's a black-backed wagtail up the road!"

Which of the following comes closest to describing how you would respond?

A. Start running in the direction he came from, saying, "Wow! That's a super find!"

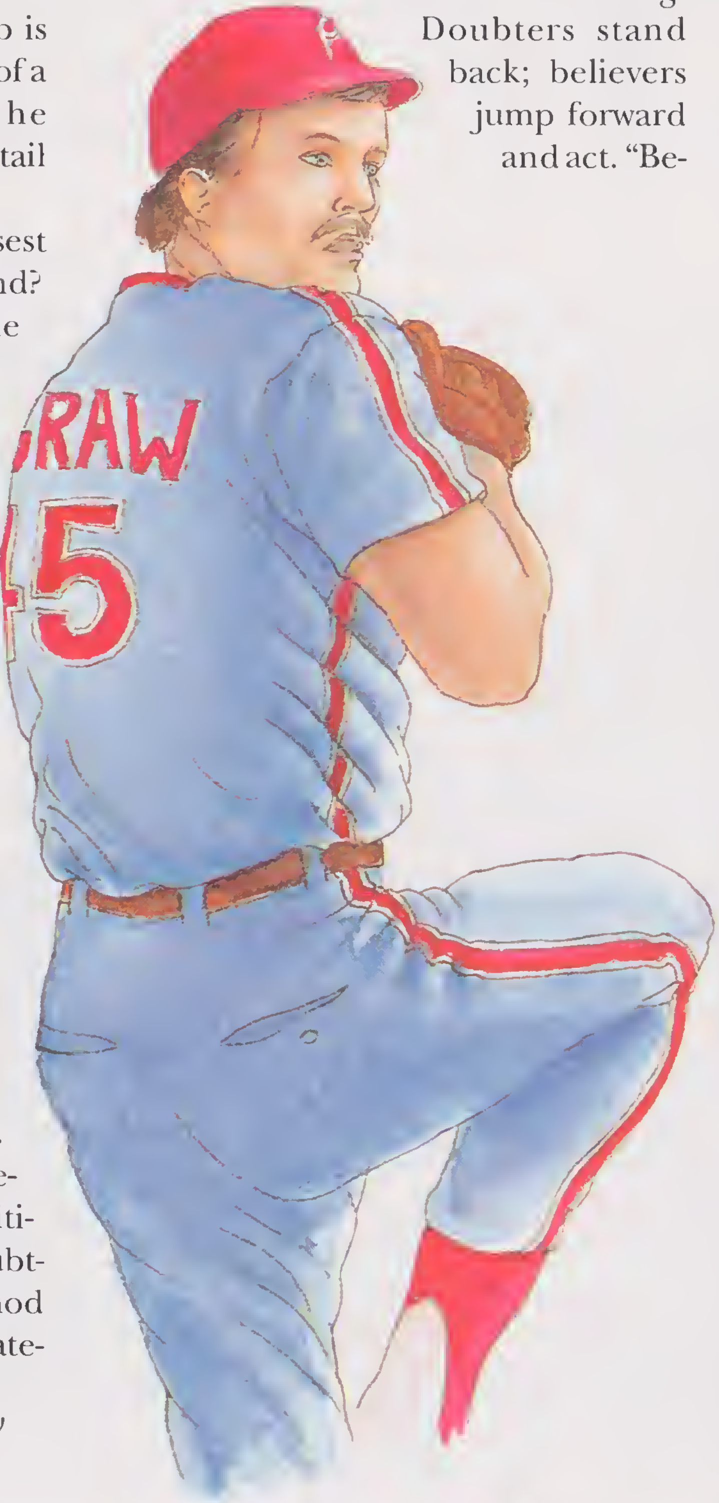
B. Smile pleasantly and say, "That would be a super find. What field marks did you see?"

C. Raise an eyebrow and say, "That would be an incredible sighting. Are you sure it wasn't a mockingbird?"

D. Shake your head, wrinkle your nose, and ask him, "Who identified it?"

Be honest now, and no looking ahead. Stop and circle your choice before you read any further.

All cognitive processes, writer and educator Peter Elbow has argued, are variations on two root human impulses: doubting and believing. Doubting involves questioning, detachment, disengagement, and criticism—it is an act of separation. Doubters look for the flaws in any method and the possible errors in any statement. "When we doubt," Elbow writes, "we tend to pause [and then] we doubt better." Believing leads to accepting, trusting, and embracing, and so it is costlier than doubting. Doubters stand back; believers jump forward and act. "Believing involves merging and participating in a community: indeed a community is created by—and creates—shared beliefs."



As Phillies relief pitcher Tug McGraw observed, "Ya gotta believe!"

ILLUSTRATION BY ANTHONY TABER

Option D above, "Who identified it?," is doubting at full blast, and though I'd guess few readers would choose it in this artificial test situation, it and similar comments are much more common in the field than they should be. Many of us like to imagine we have entered sacred ground when we walk into the woods. When a self-deluded loudmouth shouts out a blatant misidentification, the temptation to silence the heathen can be overwhelming. Option D is the best put-down of the four choices here, offers you the best punch line to recount at your next birders' get-together ("So I looked him straight in the eye, and I said . . . "), and makes it extremely unlikely that the man with the cheap binoculars will ever bother you again. No friendly conversation could follow such a comment.

Option C, "Are you sure it wasn't a mockingbird?," is only a muted variation of D—a less nasty way to distance yourself from Mr. Wagtail and show him that you know birds and he doesn't. Again, it is unlikely that much of a conversation would follow. I speak from experience here since Option C is one I have used in the field more often than I'd like to admit.

Option B, "What field marks did you see?," certainly can't be called nasty, and this formula can be used in the field peacefully and politely. Mr. Wagtail has asked you to believe a near-impossibility; in turn you are asking him, quite reasonably, to demonstrate his credibility. My guess is option B would win the popular vote among readers of this column and veteran birders in general by a landslide. It fails the test here only because it is not as good a choice as Option A.

And to understand why that is so, just study this week's news. The tropical forests continue to fall, another ozone hole has opened, the Endangered Species Act is under fire, the biggest river in your state still carries toxic wastes, and the woods down your street are being bulldozed. In short, the world needs more conservationists—active conservationists, people who are hooked on the natural world and in the fight for the long haul. Which means the world needs more birders.

Unfortunately, the majority of American citizens find watching birds less satisfying than playing golf, or less fun than shopping, or less romantic than moviegoing, or all of the above—and, let's face facts here, they always will. We can't change the nature of the game, and birders (and active conservationists) will probably always be a minority in this country. We birders do have total control, however, over one factor that keeps some people from joining our ranks, a factor that perhaps pushes away most of those people who are leaning in our direction and would otherwise be easiest to convert: *We don't work hard enough to make them feel welcome.*

The next time you meet a novice birder in the field, play the believing game.

When beginners come up to us in the field, the thought that should be uppermost in our minds is not "How can I show off my knowledge?" or even "How can I correct this misidentification gently?" It's "How can I best say, 'Welcome to the club'?" The moment when a novice approaches a veteran birder is often a critical and delicate one. You might well be the very first birder he or she has ever spoken with. Your primary task is to make certain you are not the last.

Option A is the costliest of the four choices above, the only one that requires that you expend some energy; it is also the most likely to make you a friend. The two of you will trot down the road and discover, almost certainly, that Mr. Wagtail has misidentified a mockingbird or a tern or something else. But the dynamics here are much different than they would be had you corrected his call sight unseen. Having played the believing game, having trusted in his identification as much as he did, you will share in his error. *Credo ut intelligam,* explained Saint Augustine: "I believe so that I may understand."

You might find afterward that you can give him a lesson in bird identification, if you care to (and if you remember to keep your pedagogical touch ever so light). But the crucial lesson will already be completed: he will have learned that birders are trusting, friendly folks and that he is one of us.

I can't end without pointing out one other reason for playing the believing game in the field.

Last fall, I was standing in a circle of a dozen birders at Higbee's Beach at Cape May Point when a car squealed to a halt 10 yards away. "Hey!" shouted the young man at the wheel, "fork-tailed flycatcher up the road!"

He U-turned and drove off in a cloud of dust, too quickly for anyone to judge his credibility by the quality of his binoculars or the condition of his field guide. We were left with nothing to guide us but gut instinct: Were we doubters or believers?

"Did he say fork-tailed flycatcher?" someone asked.

"Yeah, but it's probably only a scissor-tailed," said a second.

"If it's anything," said a third.

"I'm running for it," said a fourth.

And with that, the believers in the crowd were off in a sprint, that became a jog, that—"puff, puff, pant, pant"—became a hurrying walk, and that—"They must have something up there!"—became another sprint when we saw 50 or 60 birders gathered in the road. Finally, hearts pounding, heads throbbing, lungs gasping, we watched a fork-tailed flycatcher flit from tree to bush to telephone line in an open field in New Jersey, two or three thousand miles from its wintering grounds in South America.

Just as a sharp-shinnned hawk chased the flycatcher off the telephone line and into the woods, the doubters arrived. One doubter got a glimpse of its tail as the bird disappeared; the others missed it entirely. Afterward, we tried hard to be sympathetic with them, but it was a tough struggle. We had run, and they hadn't; we saw the bird, and they didn't. I personally still bear a scar on the tip of my tongue. "Hey guys," I kept wanting to say, "Remember Tug McGraw: 'Ya gotta believe!'" ■

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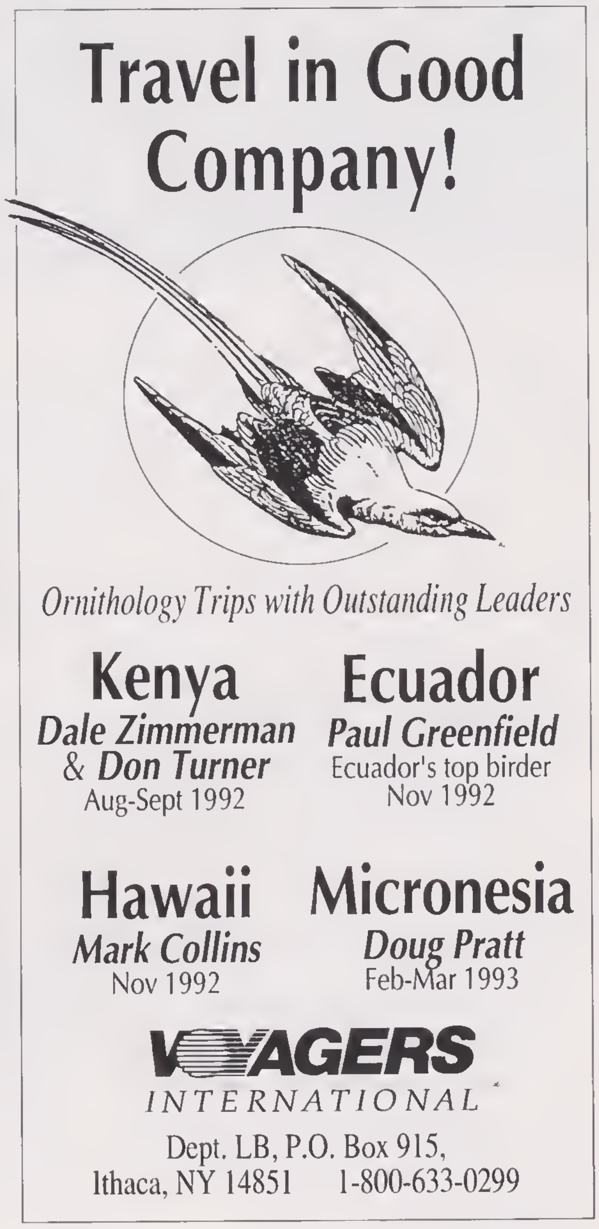

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My Turn

TUNNEL VISION IN THE NEOTROPICS

by Herb Raffaele

It's time for a change in the way we approach international conservation efforts

Concern for neotropical migrants is increasing rapidly in the United States. Coupled with this growing national interest is the realization that because many of these birds winter in Latin America and the Caribbean—far from their North American breeding grounds—the conservation of neotropical migrants can never be achieved by the United States alone. We must cooperate with the countries where these birds spend a part of each year. International cooperation is not a new idea—we've been conducting cooperative waterfowl surveys with Mexico for over 50 years, and other international activities have accelerated rapidly over the past 10 years. It's high time that the process be scrutinized.

Historically, U.S. entities have identified the basic questions we have about "our" birds on their nonbreeding grounds, and then proceeded to answer them. For example, researchers might ask, "What is the abundance and distribution of the migrant?" or "What are its food and habitat preferences?" Most North American researchers contentedly go off and answer these questions on their own. A few of the more enlightened ones go a step further and involve local biologists in the investigation. Then the research results are sent to local institutions.

This approach is the *least* effective one we can take, conservation-wise. By limiting local involvement, we do little to strengthen the capacity of local conservationists. When U.S. researchers do all the science, the knowledge gap between us and local conservationists increases. And if we don't actively involve local scientists and institutions, they are hardly likely to embrace our conclusions, and may in fact dispute them.

Furthermore, we may not be asking the right research questions. Often, we assume that increased knowledge about a species is critical to its conservation, that applied research equals conservation. This is not necessarily the case. Questions that interest us may be of little concern to local management.

Why, for example, should the islands of the Caribbean focus on the piping plover, generally a transient there, when most of their endemic parrots are close to extinction? The fact of the matter is, most countries will—and should—give significantly greater attention to their endangered endemic species than to wide-ranging migratory birds.

We feel proud that we have increased the number of Latin American conservationists working on neotropical migrants, but has this been at the expense of the resplendent quetzal and the hyacinth macaw? We argue that by saving migratory species we also help endemics, but that's not necessarily true. Some habitats in Latin America that support the greatest numbers of migrants harbor extremely few endemics. Most wetlands are a case in point.

And even if we learn all there is to know about neotropical migrants in Latin America and the Caribbean, will this take us a significant step closer to conserving endemic species? Not really. In addition to the problem of habitat differences, we have trouble accepting the small role scientific knowledge, no matter how complete, plays in species conservation. This is particularly the case in heavily populated developed countries with differing stresses, priorities, and cultural attitudes.

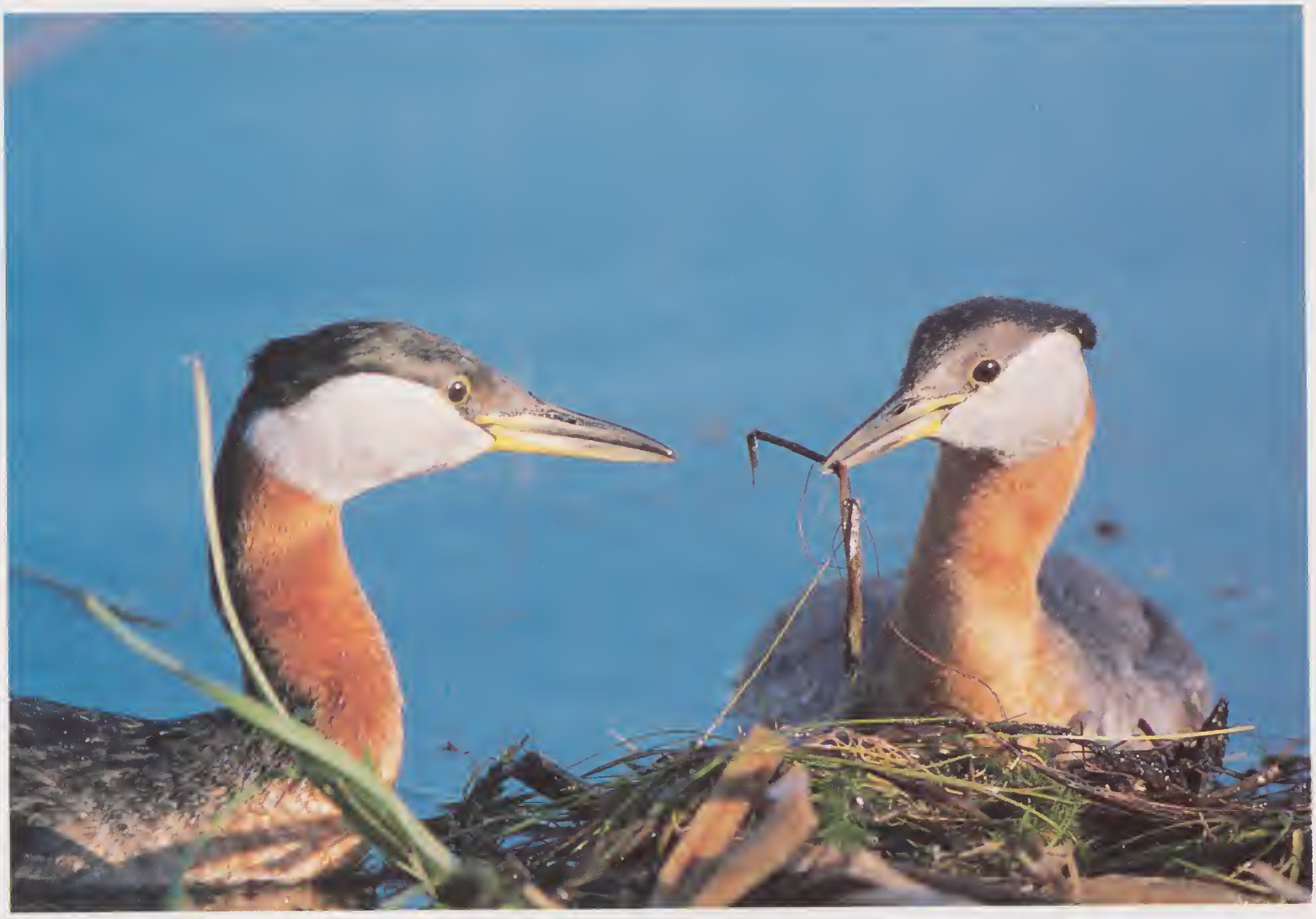
It is easy to attract local biologists to study neotropical migrants and their habitats. The lure of research money to fund field work, the glamour and sense of credibility that come from associating with a well-known foreign scientist, and the potential for international travel are more than enough to entice many local investigators. If Latin American countries had an abundance of researchers and conservationists, this scenario would be fine. But this is not the case. One of the most critical factors hampering conservation efforts throughout Latin America is the scarcity of trained professionals. Local scientists who study migrants are in most cases drawn away from other conservation efforts focused on local species and habitats.

The bottom line is that while we in the United States want to conserve "our" migrants, in Latin America this goal can be achieved only indirectly. For international conservation efforts to be truly effective they must do the following:

- address local priorities (and only secondarily integrate ours);
- train local personnel, through local institutions;
- assist local institutions to implement their priorities, not just ours;
- involve local resources, aiming toward local sustainability;
- treat research as one small component of conservation, rather than its backbone. Integrate environmental education, monitoring, planning, management, and public awareness campaigns into cooperative conservation projects;
- integrate U.S. assistance into the appropriate local institutional structure. For example, don't work with a nongovernmental organization on a management plan for a protected area that is administered by a federal agency without the clear support of that agency;
- monitor projects, and adapt them to changing conditions.

Unless we assist Latin American and Caribbean countries in a way that addresses their needs rather than our wants, our conservation efforts on behalf of neotropical migrants are unlikely to succeed. ■

Herb Raffaele is coordinator of Western Hemisphere programs for the U.S. Fish and Wildlife Service. He has over 20 years of experience in conservation and research in the region.



Red-necked Grebes: A Nest Portrait

In the long twilight of a northern evening in Canada, two red-necked grebes work on their nest together. These colorful birds gather decaying aquatic vegetation—reeds, marsh grasses—and construct a floating nest, which is usually anchored to rooted bulrushes or reeds. Nesting away from the shore provides added protection from land predators.

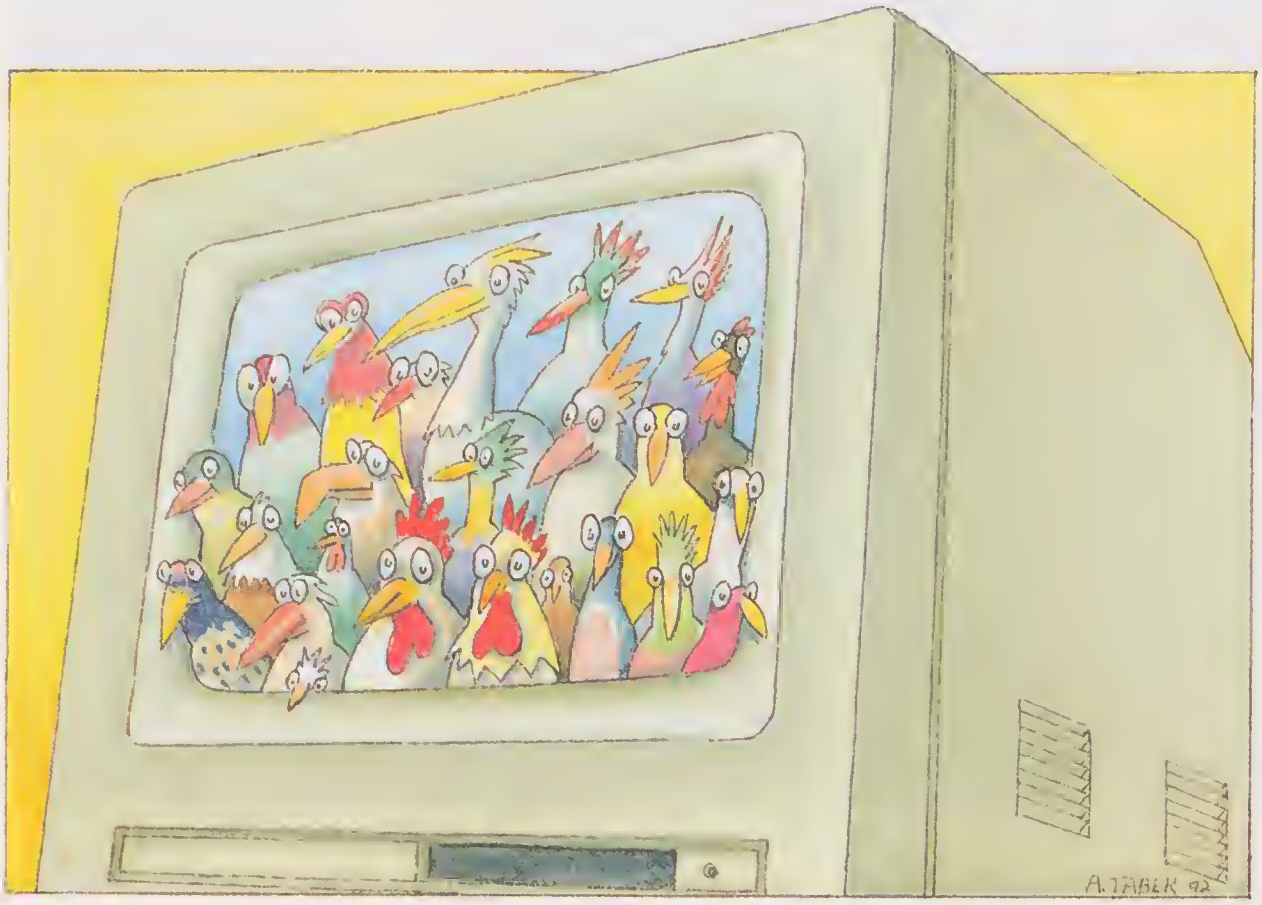
Photographer Tim Gallagher spent several weeks one summer documenting this pair's courtship and nesting activities on a shallow beaver pond in Alberta. The grebes were inseparable during their lengthy courtship. Their calls, like wild laughter, drifted over the pond day and night as they enacted their nuptial ritual, swimming in tandem with head feathers raised.

Critics' Corner

THE BEST IN BIRD-LISTING SOFTWARE

by *Jeff Wells*

Move your life list into the computer age



I saw my first common puffin 10 years ago. After a day spent squinting into the glare and struggling with seasickness, I was ready for bed as soon as I got home. But I still had to update my lists. Dutifully, I wrote the day's bird list into my notebook, filled in the date, location, number, and comments in a separate life list notebook, then took out a third booklet to check off the species on my year, state, and U.S. lists. Only sheer determination kept my bloodshot eyes open long enough to finish the job.

Sound familiar? Here's the updated scenario: Last year, when I got back from admiring a hawk owl in Pennsylvania, I turned on my computer, and 10 minutes later all my lists were complete.

Today many people are opting to computerize their bird lists, a trend that hasn't been overlooked by birders with an entrepreneurial spirit. Bird listing software offerings have multiplied like starlings in Central Park. This review will help you choose the one that's right for you.

All of the programs reviewed here run on IBM compatible machines. Each software package was scored for 10 features: ease of installation, ease of data input, listing usefulness, usefulness for record-keeping, information system capabilities, speed, flexibility, bugs, printing, and cost. Bird-listing software for Macintosh computers will be reviewed in an upcoming issue of *Living Bird*.

BIRDBASE 2

Santa Barbara Software Products
1400 Dover Road
Santa Barbara, California 93103
(805) 963-4886

PRICE: $59.95 plus $3.00 shipping & handling. BIRDBASE 2 can also be purchased with a world bird list for $99.95.

REQUIRES: DOS 2.0 or higher, one 3½" floppy or two 5¼" floppy or one hard drive, 256K RAM

BIRDBASE menus are logical and nice-looking, and you can select species from an on-screen list. (I did have some difficulty finding yellow-rumped warbler on a screenful of warbler names—a different screen design might make it easier.) You can generate state, nation, county, and residence lists, as well as special lists, including sightings of a single species and lists for specific time periods. You can also get a list of all the birds missing from your North American list—and the number of species on each list is displayed.

BIRDBASE is the fastest of all the programs I tested for data entry. One of the few complaints I have is that the program will run only with the original program disk in the disk drive—this could be a problem if the original disk becomes damaged.

For the computer neophyte who occasionally birds outside of North America, and whose main objectives are fast data input and list tracking, BIRDBASE is a good choice.

BIRDLIST

Bird Commander, Inc.
P.O. Box 34238
Bethesda, Maryland 20817
(301) 229-7002

PRICE: $99.00

REQUIRES: DOS 1.1 or higher, two floppy or one hard drive, 128K RAM

Installation is fast and efficient, although I had to change a line in the BIRDLIST.BAT file in order to get it to print correctly on my printer, a Hewlett-Packard Deskjet+. BIRDLIST menus are simple and self-explanatory, though there is room for improvement.

Inputting to BIRDLIST takes twice as

ILLUSTRATION BY ANTHONY TABER

long as it does with BIRDBASE, the fastest program. You choose names from an on-screen list, and it doesn't scroll very quickly. You can speed things up by limiting the source list to a small geographic region to narrow your choices. Another quirk is that you move down the list by pressing the PAGE UP key—the down arrow key would be more logical.

BIRDLIST displays lists for North America, Canada, the United States, all states and provinces, and discretionary lists. The total number of possible species, number of species seen, and the percentage of possible species seen are displayed at the end of each list. You can also view and print target lists, on which the species you've already seen appear in lowercase. A geographic file lists the number of possible birds in each state and province, and a bird file lists the states and provinces where each species had been recorded. Tony White, BIRDLIST's distributor, publishes a quarterly newsletter for users that tells of additions to state and province lists.

BIRDLIST does not have the flexibility of some software packages: you can't search for all listings of a particular species, you can't call up lists within a range of dates, and you can't enter the number of birds seen or any notes.

BIRDS

Scientia Enterprises
2536 Cedar Canyon Drive
Marietta, Georgia 30067
(404) 951-8252

PRICE: $75.00

REQUIRES: DOS 2.1 or higher, BASICA, two floppy or one hard drive, 128K RAM

BIRDS was one of the first commercially available bird listing software packages. It is written in BASICA, a programming language that many consider obsolete. BIRDS has some nice features, but unless you have a very old computer system, you will probably find one of the other software packages easier to use.

The program was originally written for a two-drive system and requires BASICA in order to run. The screen is set so it can be run with a television as the monitor—handy six or eight years ago but less so today when most computer users have monitors.

BIRDS does many of the same things as other bird listing software packages: life, country, state, year, and other lists. Target lists can be generated as well. It's unfortunate that BIRDS hasn't been upgraded (using QuickBASIC, for instance—hint, hint), because the program has some features not found in other packages. For example, you can generate checklists by choosing which species you want to include. Christmas Bird Count coordinators would love this feature—they could give count participants a list of expected birds. Another unique feature is the ability to export lists in spreadsheet format (Lotus 1-2-3, for example). I look forward to an upgraded version.

AVES

Ecosystem Software
638 El Dorado Avenue
Oakland, California 94611
1-800-925-BIRD

PRICE: $65.00 (Free demo disks available)

REQUIRES: DOS 2.0 or higher, two floppy or one hard drive, graphics-capable computer, 256K RAM

One of the most compelling features of AVES is its speed—everything happens so quickly that you spend little time waiting. Although AVES doesn't have an installation program, the directions in the manual are easy to follow. Menus are logical and easy to understand. Though AVES does not give you a list of species to choose from, it does allow you to type in a bird's full name or the standard four-letter acronym.

Many different lists can be generated from the field notes you input: first sightings, all sightings, sightings for a single species, a specific date or time period, or a particular geographic location. It's easy to get a count of the number of species on your state, United States, Canadian, or life list.

AVES has fancier graphics than any of the other software packages I sampled, and several other useful features. First, it will generate checklists for any area in the lower 48 states in any season and any habitat. They're not as accurate as lists by local experts, but they're pretty good. Also, the checklists tell you what page numbers to consult in your field guide for information on each species (you can choose which guide). The last feature, unique to this package, is the ability to display the North American summer and winter ranges of U.S. birds.

AVES is a good choice for novice computer users who want, in addition to listing functions, the ability to access information on bird ranges and bird habitats at the touch of a keyboard.

BIRDSTAR

LBJ Expert Systems
96 Craig Drive
Kitchener, Ontario
Canada, N2B 2J3
(519) 894-9308

PRICE: $39.95

REQUIRES: DOS 2.0 or higher, one floppy or one hard drive, 320K RAM

BIRDSTAR was released fairly recently. The price is low, and installation is easy. Unfortunately, there aren't many good points after that. You type in bird names instead of choosing from an on-screen list. Inputting your lists takes three times as long as BIRDBASE, the fastest program. If you misspell a species name, it may appear as a new species on your list; hit "h" instead of "j" and add "blue hay" to your life list.

The copy I reviewed had some bugs—none serious enough to make the program crash but frustrating nonetheless. One curious feature of this software is the list of "types" to choose from when inputting each bird record: warbler, sparrow, ground/perching, tree clinging, swallow, owl, hawk, ground chicken, marsh chicken, sandpiper, long-legged wader, gull, duck. The first species I entered was horned grebe . . . where does that fit in?

FLEXI-LIST

Parkway Software
P.O. Box 275
Villanova, Pennsylvania 19085
1-800-356-7613

PRICE: $50.00 plus $3.00 shipping & handling

REQUIRES: DOS 2.0 or higher, one floppy or one hard drive, 256K RAM

Installing FLEXI-LIST is relatively easy, and the menus are simple and straight-

	Ease of Installation	*Data Input*	*Listing Use*	*Record Keeping*	*Information System*	*Speed*	*Flexibility*	*Bugs*	*Cost*	*Printing*	*Overall Rank*
AVES	3	3	4	3	4	4	3	4	3	4	4
BIRDBASE	4	4	4	3	1	4	3	4	3	4	4
BIRDLIST	4	2	4	1	2	4	2	3	2	4	3
BIRDS	1	?	3	3	2	?	2	?	3	4	2
BIRDSTAR	3	1	2	1	0	4	1	2	4	3	2
DATAHAWK	4	3	4	3	2	4	3	4	2	4	4
FLEXILIST	3	3	3	1	1	4	2	4	4	4	3
PLOVER	4	3	4	4	1	4	4	3	3	4	4
SIALIS	4	2	3	2	1	4	2	2	4	4	3

4 = Excellent or Best   3 = Good   2 = Adequate   1 = Poor   0 = Very Poor or Worst   ? = Could not evaluate

forward. Inputting speed is comparable to AVES and PLOVER. To add a species to a list, you must type the standard four-letter acronym (the program will accept similar non-standard acronyms). Once the fourth letter of the acronym is typed, the full species name immediately appears on the screen. The speed of this action is admirable, but you have no opportunity to check your typing—why not have the user hit ENTER to make the species name appear? In a few cases I couldn't remember (or figure out) the correct acronym, but after you use the software for a time the acronyms probably become second-nature.

FLEXI-LIST has more limited listing options than many of the other programs. For example, you can't input daily lists with numbers, then generate state, year, country, or special lists. The program is designed to check the entries under each list for the codes you have inputted. For example, if you were on a birding trip that included stops at Cape May and Brigantine, you could enter C and/or B for each species seen. You could then find out how many species you saw at either site or both.

FLEXI-LIST has a number of print options and allows printer escape code manipulations for those who want complete printer control.

SIALIS

Alfred Milch
461 Palmer Avenue
Teaneck, New Jersey 07666
(201) 836-1496

PRICE: $75.00 plus $3.00 shipping and handling (demo disk for $3.00)

REQUIRES: DOS 2.0 or higher, hard disk, 500K RAM

This program comes with a list of the birds of the world. The manual describes list-naming conventions that are important to follow when entering a list. You choose a limited geographic area from a simple menu, and see another menu with four major subdivisions of birds. After choosing one of these subdivisions, you are presented with a list of bird families. These family menus are the same no matter which geographic area you choose. For instance, even though I restricted my lists to North American species, the list of families included Cassowaries and Sun Grebes. Having all those families on the menu makes it difficult to find the ones you want. Also, some birds are listed under families that North American birders might not be familiar with. To find blackbirds I had to look under "Troupials and Allies"—not a name that comes readily to mind when looking for red-winged blackbird.

I found the method for choosing species a bit awkward. First you enter the number of species from the list that you wish to input. Then you type in the code number for the species (code numbers are listed beside the species name). Many species do not follow AOU conventions. For example, common grackle is listed as two species: purple grackle and bronzed grackle.

The menus in SIALIS can be somewhat confusing, and the manual isn't particularly useful in understanding how the program works or what it can do. Although a number of lists can be generated, including lists of all species seen in a particular family, SIALIS seems less flexible than many of the competing programs. In general, the user interface is not as good as it is in the better software packages, though the listing functions available are similar.

PLOVER

Sandpiper Software
9 Goldfinch Court
Novato, California 94947
(415) 892-9871

PRICE: $65.00 plus $3 shipping & handling. Sibley-Monroe world list of birds available in compatible format: $60 for common names, $75 for common and scientific names.

REQUIRES: DOS 2.0 or higher, two floppy or one hard drive, 320K RAM

PLOVER has an easy-to-use installation routine, and the manual is clearly written. It took me about the same amount of time to input my lists in this program as it took in AVES—about 10 minutes longer than in BIRDBASE. PLOVER has more flexibility than other software packages. For instance, to add a species you can type the full bird name, the four-letter acronym, or choose names from a master list. The master list, however, contains all the species in North

America, so it's tedious to scroll through. A world bird list can also be purchased for use with PLOVER.

Choosing where to store data is easy with PLOVER. You can generate and print lists of virtually any kind. One unusual feature is the ability to calculate some simple statistics from your lists. You can review the first and last observation of a species, the mean arrival and departure dates, and the earliest and latest dates for a season.

Of all the software packages I reviewed, PLOVER is my personal favorite. It's the best choice for listers and record keepers who need maximum flexibility and control over their data.

DATAHAWK

Turnstone Software
1838 Barry Avenue, Suite 12
Los Angeles, California 90025
1-800-654-5676

PRICE: $89.00 plus $4.00 shipping & handling

REQUIRES: DOS 2.1 or higher, one hard drive with at least 1.3 MB free, 512K RAM

Installation is menu driven and simple. Inputting is relatively fast, with easy-to-use pull-down menus. You can enter your lists in a number of ways, with space for notes and numbers. For birders who keep county or region lists, DATAHAWK allows the designation of up to 27 wild card regions. You can generate lists of species seen and target species (as well as the number on the list) for the United States, Canada, each state or province, specific locations, and specific time periods. Lists of sightings of a single species can be displayed as well.

DATAHAWK prints better-looking checklists than any of the other programs, and you have several options for checklist set-ups. I printed out a three-column checklist of the birds of New York that was a manageable three pages long. If you want excellent field checklists for trips anywhere in North America, DATAHAWK is the program for you—as long as you have a hard drive. ■

Jeff Wells is a birder and a graduate student at Cornell University. He studies grassland birds in his favorite listing area, the state of Maine, where he has seen 309 species.

BIRDS
OF THE
WORLD
A CHECK LIST
James F. Clements

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By James F. Clements, Ph.D.

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The Catbird Seat

ON THE ROAD AGAIN

by Pete Dunne

It was late, real late. The banquet was over. The speaker had left the podium. And the motel's banquet crew was waiting impatiently for the members of the American Birding Association (ABA) to quit the room—a thing they were disinclined to do.

"Now what?" the banquet crew muttered to themselves.

"What's the deal?"

"What's the holdup?"

"I wanna go ho-o-ome!" one particularly gifted member of the crew wailed.

Well, the crew didn't go home, not right away. Instead, they went on a tour to a continent that none of them could claim familiarity with. To their utter astonishment, it was the continent they lived on: this continent.

As the banquet crew watched, 20 slides were projected, each depicting a landscape, a scene. Each was different. None was identified by edifice, banner, or sign.

One slide showed a chalk-colored trail straight cut through a tunnel of living trees. It had a tropical flavor.

"Snake Bight," 500 ABA members shouted as one, putting a name to this famous Everglades avenue (a place whose mosquito hordes have drawn more blood than Genghis Khan and the Red Cross put together).

Another slide showed an arid, desert plain, pinched by mountain peaks until it formed a verdant, green canyon.

"Cave Creek," the birding chorus chanted—singing the praises of Arizona's trogon epicenter.

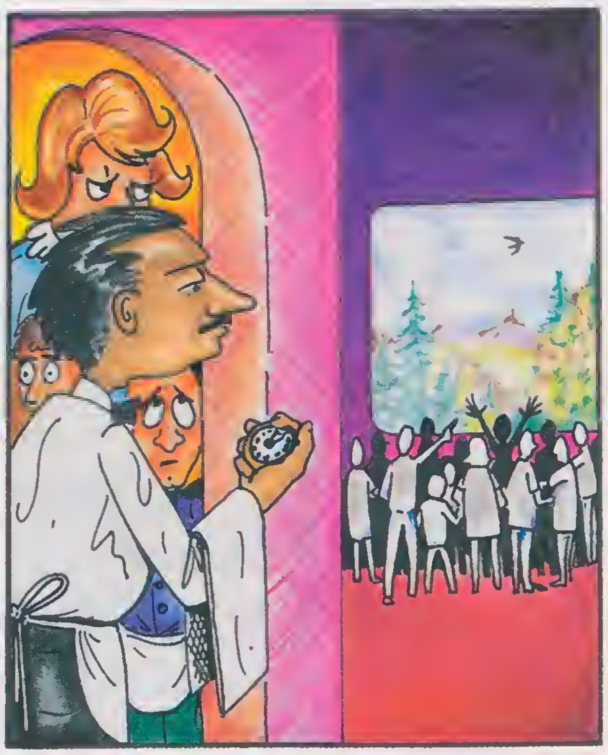
Still another depicted a misty, shimmery, rock-encrusted cove—a very beautiful but inhospitable looking place.

"Attu," most of the ABAers shouted.

"Casco Cove," a precision-minded minority asserted.

The waiters and waitresses just stared in disbelief. What they were witnessing couldn't have been staged. It was far too spontaneous. But just the same, it couldn't be real, could it? Five hundred people, drawn from across the continent, simultaneously identifying patently obscure corners of the planet.

I mean, it wasn't like someone was holding up flash cards of the Manhattan skyline, or Disney World. These people, these *birders*, were pinning names to photos of rocks and trees. They were tossing off names to places that most of the young waiters and waitresses in this college town had never even heard of.



There are a lot of things to like about birding, but one of its most compelling attributes is the avenue of discovery that it paves. It starts at your own front door and goes on . . . to a boulder-strewn outcropping straddling the crest of the Kittatinny Ridge, where excited onlookers point skyward as migrating hawks hitch their fortunes to the wind; to a crumbling brick fortress mantling a coral key, where great soaring birds hang motionless against the clouds; to a roadside picnic area off a two-lane Arizona highway . . . or an accidental sea in the California desert . . . or a seawall with its back up against an old New England shipping town . . . .

It's a road that goes everywhere and, once you step upon it, can sweep you any place, any time. The road savvy you gain bonds you to the continent and to fellow voyagers: fellow birders.

Don't you think it's remarkable that two total strangers could meet on a bench in Cape May Point, New Jersey, and converse about a particular telephone pole in Madera Canyon, Arizona—one boasting a strategic (and occupied) woodpecker hole? Even more remarkable, at the end of this conversation (which really did happen), a *third* party advised the conversant pair that the elf owl had moved "one pole over."

Have you ever marveled at the conversations of professional bird tour leaders who in the course of giving directions can plot a mental course . . .

"Over the cattle guard at the top of the hill."

"Right."

"Down to the water tank where the road turns right."

"Okay."

. . . to intercept some pale, prairie plover nesting in an isolated pasture in an obscure corner of a state that most Americans only associate with packed powder snow and a brand of beer that brings back the spirit of the sixties?

In the course of their quests, birders gain a sense of the continent that even a long-haul trucker might envy. Birders know where to get the thickest chowder in Gloucester, Massachusetts, and the spiciest chili in Brownsville, Texas; know in which states "coffee regular" means with milk and sugar and in which states "regular" means black.

But most of all, and best of all, birders know that at any time they choose, they can just get up, put their feet on that old familiar road, and let it sweep them to adventure in old familiar haunts or discovery-filled corners—any place, any time. Even right now (if you've finished your coffee). ■

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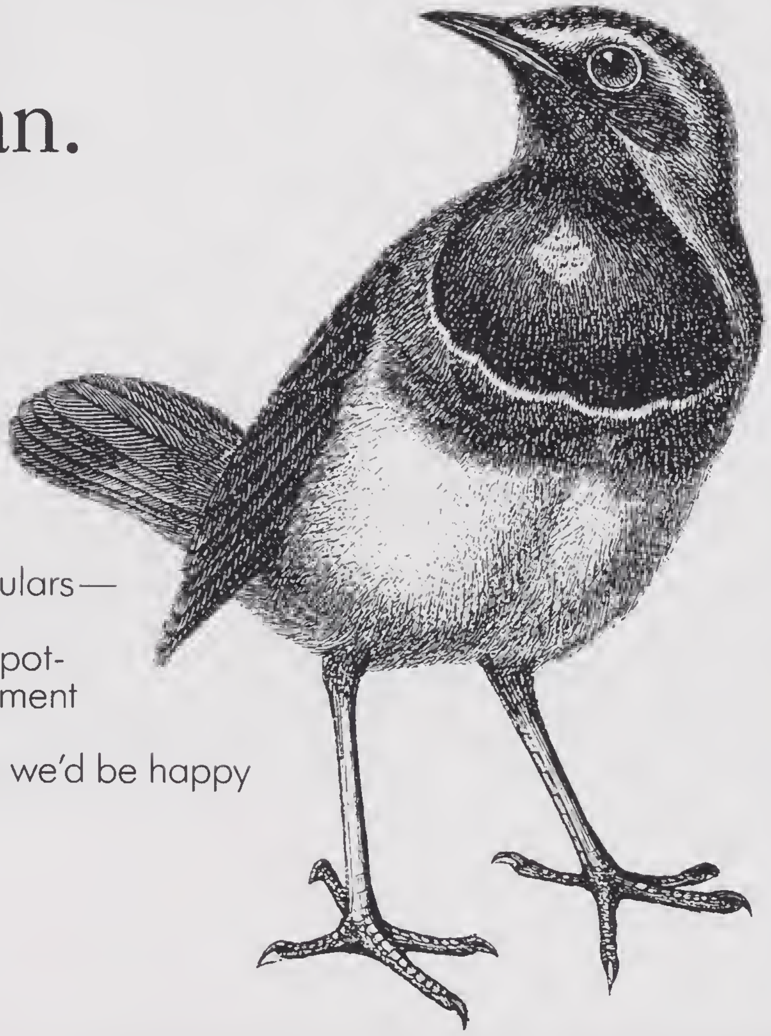

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LIVING BIRD

r the Study and Conservation of Birds

AUTUMN 1992

TIM GALLAGHER

LIVING BIRD
CORNELL LAB of ORNITHOLOGY

Give a Gift . . . Get a Gift!

The holiday season is almost here. If you're searching for a special present for your friends or loved ones, consider giving them gift memberships in the Lab of Ornithology. Your gift will be enjoyed and appreciated all year long as your friends read *Living Bird* and *Birdscope.* And you'll have the satisfaction of knowing that you're helping to support our vital work on behalf of birds.

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Now, for a limited time, when you give a new gift membership you'll receive an attractive Lab of Ornithology mug free as a token of our thanks. All new gift memberships received between October 1, 1992, and December 25, 1992, are automatically eligible for this special offer. (Sorry, offer does not apply to renewal gift subscriptions.) Just send in the gift membership form inside this issue or call (607) 254-2421 and ask for our special gift membership offer. (If you'd prefer that the mug be sent to the person receiving the gift, write "Send mug to gift recipient" at the top of the order form.) There's no limit to the number of gift memberships with mugs you can order. Gift membership orders must be received by December 6 to be delivered in time for the holidays. Place your order today!

CORNELL LABORATORY OF ORNITHOLOGY
For the Study and Conservation of Birds

A Publication of the
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LIVING BIRD

AUTUMN 1992 VOLUME 11 NUMBER 4

Greetings from Sapsucker Woods

I see by the blustery skies and the changing color of the leaves on the trees outside my office window that autumn is upon us again. You may recall that last autumn we unveiled the newly redesigned *Living Bird.* I can't believe an entire year has gone by since then. I want to thank all of you who called or wrote to us this year with your comments, suggestions, or complaints. We value your opinions.

As this issue readily shows, *Living Bird* did not lose its uniquely eclectic personality with the redesign. Glancing through these pages you'll find Italian Baroque paintings, salmon flies, and an article about barnyard chickens, alongside a research piece on cowbird parasitism and a naturalist's reflections on a family of pileated woodpeckers. But you will also notice some overriding themes carried through the entire magazine: an appreciation of birds, a recognition of the threats to their well-being, and a call to action on their behalf.

Bird have never faced such dire threats as they do today, with massive destruction of habitat, pollution, global warming, and more. Many species will need the help of people like you and the other Lab members and staff if they are to survive into the next century. We'd like to thank all of you who responded to our plea in the last issue, spreading the word about the Lab of Ornithology to your friends and bringing in new members. Your help is greatly appreciated. The more members we have, the more effective we will be as an international force for bird conservation.

— *Tim Gallagher, Editor*

Features

10 **Vigil with Pileateds**
by Ted Levin
A naturalist spends a season with these magnificent woodpeckers.

14 **Sinking in the Shawnee**
by Jerry Sullivan
If we don't preserve large unbroken tracts of forest, many more nesting songbirds will fall victim to cowbird parasitism.

20 **The Ugly Salmon Fly**
by Ted Williams
A rare treasure . . . at the expense of rare birds?

26 **Binocular Quest**
by Todd A. Culver and Heather Gerhart
This year's crop of optics gets a grueling workout from Lab staffers.

32 ***La Caccia:* An Italian Tragedy**
by Ann Taylor
The centuries-long slaughter of birds ranging from passerines to raptors continues in Italy, and no end is in sight.

Departments

4 **Letters**

5 **BirdNews**

Columns

6 **Flying Field** *by Roger Welsch*
Take time to get acquainted with a beautiful and frequently overlooked living bird.

8 **My Turn** *by Karl David*
In defense of listomaniacs.

38 **The Catbird Seat** *by Pete Dunne*
A great aviasophical debate is overheard.

Cover: *Willow ptarmigans are a common sight in Alaska's Denali National Park. Wildlife photographer Darrell Gulin was climbing down a hill at the park one autumn morning, trying to get close to a moose, when he came upon this ptarmigan feeding. Later, in winter, the bird will sport a stunning white plumage to blend in with the snow.*

Right: *The scarlet macaw is one of several rare birds whose feathers are used to tie traditional Victorian salmon flies. Article on page 20. Photograph by Greg Vaughn.*

Back Cover: *The pileated woodpecker's great size and spectacular, flaming red crest earned it the folk name, "king-of-the-woods." Read more about this fascinating species in Ted Levin's article on page 10. Photograph by Bill Lubic.*

LIVING BIRD

AUTUMN 1992 VOLUME 11 NUMBER 4

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Letters

Splendid Snowies

I live on a farm and have never seen an owl near enough to really enjoy. Jack Barrie's snowy owl pictures ("Northern Invader—Portrait of an Arctic Phantom," Winter 1992) were wonderful . . . almost mystical in their beauty.

Susan Foster
Colrain, Massachusetts

I want to thank Jack Barrie for the snowy owl photographs and for his dedication in obtaining them. And I want to thank you for including them in the Winter 1992 issue. They are *very* special indeed!

Lisa D'Andrea
Bridgehampton, New York

Safety First

I enjoyed the Spring 1992 issue of *Living Bird*, especially the article on nest boxes ("A Basic Box for a Basic Need," by Scott Shalaway). When building a nest box, however, I suggest constructing it so that the front hinges at the bottom rather than the top, to prevent eggs or young from dropping out the open bottom.

Dave Pardoe
Washington, D.C.

Unsolved Mystery

Jack Connor's article in the Winter 1992 issue of *Living Bird* ("Mystery on Mill Pond") invites a response from one who has been similarly mystified.

I live in a small town on the Allegheny River in northwestern Pennsylvania. I cross the river daily as I walk to work, and have for 35 years. This past winter, for the first time, and for reasons unknown to me (the drought? a landfill closing?), flocks of ring-billed gulls have joined the already large flocks of mallards and a small flock of hooded mergansers on this stretch of river.

For a month, I watched the gulls dive at the mergs—always the females. I have yet to see a merg fly when a gull swoops and lights [as Connor described]. Rather, the mergs always dive and come up a bit later. They don't seem upset, and otherwise the gulls and mergs share the river quite placidly. I have suspected, and Jack Connor confirms, that the gulls are only interested in a merg that has successfully brought up a fish.

William M. Hill, Jr.
Warren, Pennsylvania

Re: Review

The review by Jeff Wells of my birdwatching software, SIALIS, was disappointing. Some criticisms were valid, and I took them seriously. For example, Wells said it was confusing when such families as Cassowaries and Sun Grebes showed up when compiling a list of North American species. I have changed the program so that family names no longer appear out of place.

Wells's complaint about flexibility is off the mark. SIALIS is very flexible; it is therefore slightly more difficult to learn. For instance, while I was recording sightings from a recent trip to Cape May, the program automatically updated my year list for 1992. If I had also wanted to update other lists—for example, my life list—the program could have done this too, in a semiautomatic way. Second, SIALIS has excellent statistical capabilities. It will survey field notes, either completely or for specified times, and provide a list of sightings of any species. Statistical analyses could then be drawn from this information. Finally, SIALIS will display an index of list titles for any year or for all years.

Alfred Milch
Teaneck, New Jersey

We welcome letters from readers.
Address letters to: The Editors,
Living Bird, 159 Sapsucker Woods
Road, Ithaca, New York 14850.

University of Wisconsin News and Information Services

TEMPLE WINS CONSERVATION AWARD

Stanley A. Temple, a former member of the Lab's administrative board, is a Chevron Conservation Award winner for 1992. Temple was recognized for his pioneering work in two areas: restoring endangered bird species and establishing links between fragmented forest habitats and songbird declines. A professor at the University of Wisconsin in Madison, Temple is also president of the Society for Conservation Biology. The Chevron awards program honors individuals and groups who may otherwise receive little or no recognition for their efforts in protecting and enhancing the nation's natural resources.

A NEW KIND OF NEST PARASITE

Does the word "parasite" evoke a bloodsucking invader? Something as apparently innocuous as where a bird chooses to nest can also extract a cost from another species. Martha Groom of the University of Florida, Gainesville, recently reported the first known case of behavioral parasitism in a mixed-species nesting group. Her study of sand-colored nighthawks along the Manu River of southeastern Peru appears in the journal *Ecology* (vol. 73:785-793;1992).

Most members of the nighthawk group are solitary nesters that rely on camouflage to avoid predators. Sand-colored nighthawks, however, nest in large groups on riverside beaches in the company of large-billed terns, yellow-billed terns, and black skimmers—species that actively defend their nests.

Groom found that the nighthawks had significantly higher reproductive success when they nested within 30 meters of a tern or skimmer. Terns and skimmers, on the other hand, had lower nesting success when large groups of nighthawks nested nearby. The nighthawks seemed to attract predators, forcing the other birds on the beach to spend more energy defending and less time caring for their own offspring.

LYING TO THE LADIES

Like the cheatin' heart in a country-western ballad who hides his wedding ring when he's flirting with another woman, male pied flycatchers pretend they're unmated to attract a second mate. That's what researchers from the University of Pittsburgh and Uppsala University of Sweden concluded after a recent study of this polygynous species (*Behavioral Ecology and Sociobiology* 29:167-175;1991).

The researchers evaluated the way males responded to caged females on their territories. They discovered that mated males changed their behavior in order to attract a second female—spending more time on the territory and courting more—and females seemed to fall for the act.

NEW SERIES GOES BEYOND BENT

The American Ornithologists' Union and The Academy of Natural Sciences of Philadelphia have launched a landmark new serial publication, *The Birds of North America* (BNA). This long-awaited successor to Arthur C. Bent's classic *Life Histories of North American Birds* is a comprehensive reference on the biology and behavior of more than 700 native nesting birds. The publication goes beyond the scope of Bent's work by highlighting gaps in ornithological knowledge and by emphasizing information that will be useful in managing rare and endangered bird populations. Support for the project comes from the Office of Migratory Bird Management, the National Fish and Wildlife Foundation, and private foundations and benefactors.

BNA is composed of individual species accounts, each one written by experts on the species. The first eight accounts, including the barn owl, piping plover, and king rail, have already been printed. When complete, the work will consist of over 14,000 pages, organized in 18 volumes of 40 species accounts each. BNA is available by subscription; for more information, call (800) 354-8112, Department LB92.

NO-NETS BENEFITS

Japan has banned the possession, sale, and export of mist nets. This is good news for songbirds in Asia and Europe, where the hair-fine nets have been used to fill restaurant plates, not data banks. But the ban also hinders legitimate scientists, because Japan is a major international source for the nets. Conservation groups are working with the Japanese government to develop a simple mechanism whereby ornithologists can still purchase the nets.

WE HAVE A GOOD THESAURUS

Living Bird has received an award for excellence in staff writing. The magazine's staffers garnered a silver medal in the annual recognition program for college and university magazines sponsored by the Council for the Advancement and Support of Education (CASE). *Living Bird* also received a bronze medal in the category "Special Interest Publications." This is the ninth year in a row that the magazine has been a CASE award winner.

COMPILED BY CYNTHIA BERGER

A MISSING ENTRY IN YOUR LIFE LIST

by Roger Welsch

To find this neglected bird, take a field trip to a farmyard

Oh, I know what you want, you bird people. You want to hear about the time I was in the yard, tinkering with the tractor, when something made me look up. I often look up; I watch sandhill cranes and geese heading north or south, follow the graceful peregrinations of cliff swallows, wonder about the *weltanschauung* of an eagle wheeling high over the river. This time, however, there was no watching, no wheeling, no wondering. My eyes, prepared to focus on a point far distant, were filled with a B-52 of an eagle, not a mile or a quarter-mile above my head but just overhead, almost within reach.

I am accustomed to wildlife's disdain. In fact, I expect it. I accept that I am merely an inconvenience, an inedible organism causing minor disruptions in their hunting and gathering patterns. But this eagle was different. For his own reasons, he decided to acknowledge my existence. He turned his head and looked at me. I saw his eye; I looked *into* his eye. In an instant he was gone, busy with far more important things than me, but it was a long time before I found anything more important than him. A day—maybe even a life—is never the same after you've looked straight into the eye of an eagle.

But I'm not going to tell you about eagles. I'm going to tell you about my chickens.

Now, calm down. Chickens are birds just like eagles, after all. And they are beautiful birds, and interesting birds, and I am the one who is writing this essay and so I'm going to write about my chickens. I like my chickens. I *really* like my chickens.

They are not special chickens. They're just plain ol' chickens, but even plain ol' chickens can sport plumage as splendid as rainforest exotics. Dan Selden's mother started us off with a red hen and four chicks of dubious lineage, and then Kenny Roy gave us some remnants from his flock of fancy chickens—some reddish brown ones with fancy pants, two little shy black ones that look like powder puffs, a couple of gloriously colored roosters with long, pennant-like tail feathers, a couple of feisty little guys that clearly have bantam blood, and a monster white rooster who terrorized the entire farm—not just other chickens but dogs, cats, and people—until we sent him to chicken heaven to consider his ill manners.

So some are black, some are red, but most of them are white chickens because Linda says farm chickens are supposed to be white. Like subtly plumed wild birds, though, the plainest hen in our flock takes obvious pride in her snowy-white feathers—purposely, I suspect, pulling her several black beauty spots to the surface.

I am not one of those enthusiasts who breeds chickens in a carefully managed program, for profit, prestige, or as a hobby. My birds make their own social arrangements. We don't consider our chickens as anything but ordinary. We harvest our birds' eggs but we give most of them away, and we have never been able to bring ourselves to eat one of our birds; they, too, go to friends. We don't see our chickens in the same no-nonsense light as our neighbors, the "real" farmers.

Originally, our chickens were little more than cheap labor. The first two years we lived on our farm, grasshoppers ravaged Linda's lilacs and my hop vines. Our place looked like Egypt after the biblical plagues. Now, thanks to the chickens, grasshoppers are an endangered species here and, if they are smart, they cower deep in prickly junipers. Whenever frustration or pride drives a grasshopper into the open, there is a flurry of variegated chickens and the sorry miscreant dies an instant death. There's no safety in numbers for grasshoppers here; chickens are to grasshoppers what I am to popcorn.

We consider the prosperity of our lilacs and hops a fair trade for the water and corn we haul to the henhouse during the winter. But our chickens give us more. Like wild birds, our chickens contribute to the wonderful and eternal cycles of nature. Okay, that should be obvious, but remember: we were city folks before we came to the farm.

We are full-tilt recyclers, always have been, and what we don't recycle or reuse around here, we used to compost. We piled the stuff up, worked it a little, and in a few months, we had a couple shovels' full of rich black soil. Now we toss everything from apple cores to fat scraps to our chickens. With enthusiasm they not only convert our scraps to a high-potency fertilizer within hours, but—get this!—they take it to the yard and distribute it evenly for us. And what they don't convert to fertilizer, they fashion into gorgeous food nuggets with bright orange yolks and ivory shells.

I can't imagine being without chickens now. Everyone, even in cities, should have a couple chickens. But that's still not the best part. The best part of our chickens is something the readers of this column know well. Our chickens, like the birds conventional bird watchers observe and admire, have varied and unusual song, splendid plumage, and fascinating lives. They bring humor, comfort, and color to our lives—and ask almost nothing in return.

I listen to birds more than I watch them. I love the ringing bell call of blue jays and the *brr-rr-rr* of the cranes in the spring and fall. I laugh at the mad arpeggios of the meadowlarks in the uplands and the whoopee cushion call of nighthawks. And now I wake to the proud, promising optimism of our roosters' calls—the full-throated arrogance of long-tailed Chanticleer, the squeaky, wisely hurried squawk of little Rudy (as in "-toot-toot"), and the tentative practicings of Teenager Boom-Bah. We know the sounds of a hen laying, or clucking (which means she is ready to "set" a batch of eggs), the contented chuckles of our flock combing every square inch of our yard for protein not currently in use, the strangled *urk*s of the hen who for almost three years has sounded as if she has 15 minutes to live.

I often wonder about the furious antipathy crows have for owls, or the unpredictable appearance of gulls on the Plains; the society of our chickens is no less intense and curious. From our kitchen window we watch the changing alliances. Rudy cowered in the henhouse with the two black puffballs when we had three big, mean roosters, but once our chicken society had been relieved of their tyranny, Rudy blossomed with bravado, intimidated by no hen's size or social stature. He gathered quite a harem, and we laughed at this little cock-of-the-walk strutting our yard with his ladies. Then big, white Teenager Boom-Bah reached adolescence and took on the ways of his autocratic, late and unlamented father, and Rudy lost some fickle ladies to him. "Good riddance," I tell Rudy. "Who needs hens like that?" But he seems unconvinced.

Personality? Some hens proudly offer up their eggs, others—we know them by name too—punish us for reaching under them. And there is nothing as pretty as a hen with a brood of chicks in the yard. No mother is more glowing. Last summer our scruffiest hen had a brood and miraculously, she became a dignified, responsible matron of considerable bearing. Moreover, she didn't lose her new character, even after her children became predictably ungrateful for her maternal sacrifices.

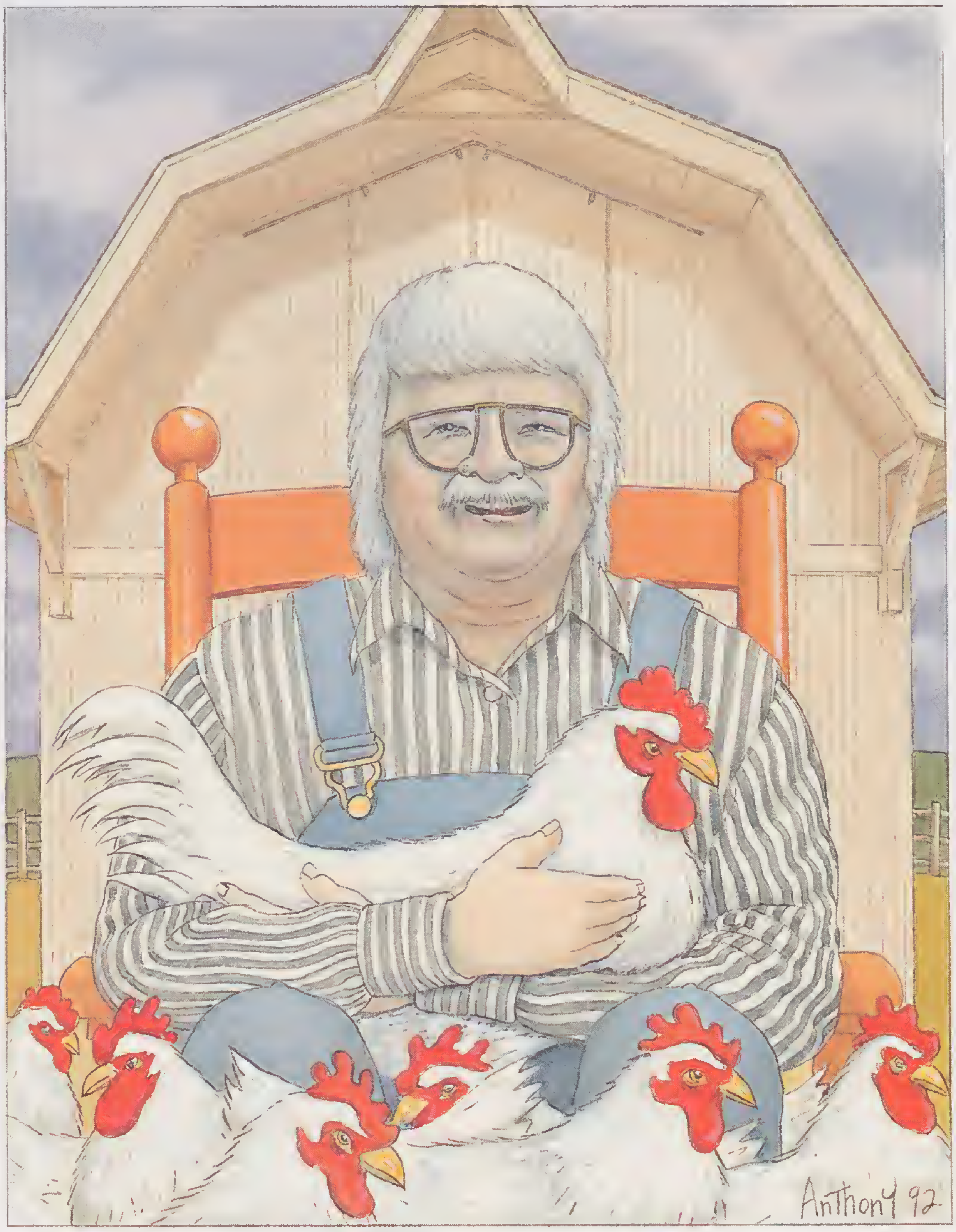
We know our wild birds. A rooster pheasant used to wake us every morning; I'd sit up in bed quickly, hoping to catch sight of him stretching to his full height and exploding with that catarrhal cough pheasants call a song. I have known wrens by name, and meadowlarks with their yuppie V-neck sweaters. One full winter I recognized an eagle by his notched wing. But I have never felt closer to birds and their wonder than I have with our lowly chickens.

Our chickens are creatures of personality and color, useful and appreciated members of our farm community, unpredictable, curious, independent, fragile, tough, courageous, wonderful birds, not all that different from their wild cousins flying high over the henhouse on their annual migrations.

Know what I think? I think you should take out your field guide and at the bottom of page 160, maybe right below "Lesser Prairie-Chicken," write in "Common Barnyard Chicken." Then, the next time you get a chance, take time to watch this beautiful living bird. Are chickens less remarkable because they have become our friends and partners? Not in my book.

There it is, in my book—at the bottom of page 160—"Common Barnyard Chicken." ■

Roger Welsch is a folklorist, tree farmer, and essayist for the CBS television program "Sunday Morning." One of the central figures in his next book, Touching the Fire: Buffalo Dancers, the Sky Bundle, and Other Tales *(his sixteenth book and second work of fiction) is a bird . . . but not one of his chickens.*



"I like my chickens. I really like my chickens."

ILLUSTRATION BY ANTHONY TABER

My Turn

PROUD TO BE A LISTER

by Karl David

Two entries from a fictional birder's dictionary:

Chas·er *\ 'cha-sər \ n : one who drops any commitment, travels any distance, endangers any relationship, in the hopes of adding a new bird to the list (see under lister).*

List·er *\ 'lis-tər \ n : one who compulsively keeps lists of all birds seen or heard in a lifetime, year, state, backyard, etc., often resorting to chasing (see under chaser) to add another tick to the list.*

The time was July of 1983; the place was Massachusetts, and the bird was the celebrated western reef heron that had somehow found its way from Africa to Nantucket Island. Roger Tory Peterson was calling it "the bird of the century." I had to see it. So I cadged a ride with a Massachusetts Department of Fish and Wildlife photographer who had been assigned to photograph it.

I was on my own getting back, however. I stepped off the ferry from Nantucket to begin the worst hitchhiking experience of my life. I got only a quarter of the way back by nightfall and spent the night alternately walking and dozing off under overpasses. After daybreak I got a few rides, but I still had to walk the last 13 miles. The bottom line? I saw the bird. Nothing else mattered.

Since then, I've never gone to such lengths to see a bird, but I'm definitely still a lister. I keep a North American list, a dozen state lists, and some others. But the list I work on the hardest is the one closest to my home in Ithaca, New York: the Cayuga Lake Basin year list.

Two years ago, several local birders (myself included) began a friendly competition to see who could rack up the most basin birds in a year. The ante is being upped with alarming rapidity: the first year's high of 221 species was shattered by 245 the next, and this year three birders (myself *not* included) are already ahead of that pace. Clearly only around-the-clock birding will do now if we hope to keep breaking the record.

WESTERN REEF HERON BY BILL BYRNE

Worth a sleepless night by the side of the road? You bet!

Not everyone in our bird club is happy about this expenditure of time and gas. Why can't we just sit back and let birds come to us instead of compulsively chasing them down? As an environmentalist, I know that I could do more to save the habitat that those ticks on my list need to survive, and I must admit I sometimes feel guilty. So I'd like to take this opportunity to make several points in defense of listing:

(1) Listing adds significantly to knowledge of local avifauna. For example, before our competition began, basin birders recorded golden eagles at best once or twice a year. But in our increasingly intense coverage of the basin, we have discovered a site not previously known as a hawk migration hot spot from which six of these great raptors have been seen in just one spring.

Sedge wren is another good example. This is a threatened species in New York, with no recorded sightings during the first five years I birded in the basin. But last year sedge wrens were found in no less than three locations—a starting point for any researcher who wants to determine if they still nest here, and if not, where they might be induced to do so with proper habitat management.

(2) Listing improves birding skills and sharpens powers of observation. This (club critics take note) makes for more knowledgeable leaders on field trips. Since I've started listing I know what birds to expect where and when, so that from the constant background of normal comings and goings I'm able to pick out (and savor) the truly unusual event. Moreover, since the information from unusual sightings is written down, it isn't lost in the mists of the passing years.

(3) Yes, chasing birds does take up time that could be spent in conservation efforts, but the two goals are not mutually exclusive. That landowner who approaches you with suspicion when he sees you gazing at his property might benefit from a little instant education when you explain what you're doing. Besides, if I chose to exchange my listing time for a socially acceptable hobby like tennis, no one would complain—except perhaps the people waiting to get on the court.

(4) Finally, I've found that listing builds camaraderie. My friends and I are constantly calling each other up to find out who has seen what and to plan our next moves. Knowing what has gone into amassing a respectable year list gives us a shared experience that binds us together in a way that garden variety bird walks would not.

Well, I could go on, but I have to hurry or I'll miss today's "Mr. Ed" rerun. You see, I'm keeping a list of all the birds heard on the sound track, and I'm still missing a few episodes. ■

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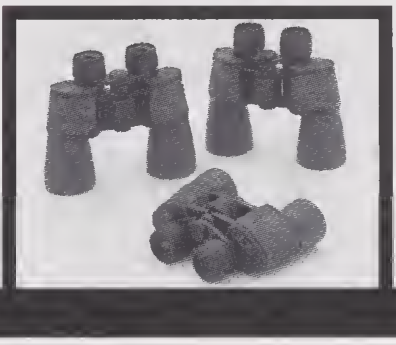

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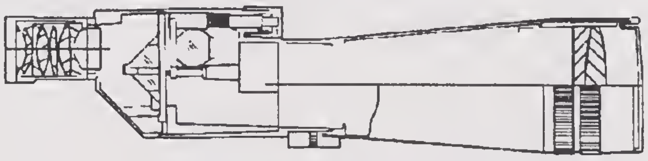

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DARRELL GULIN

VIGIL WITH PILEATEDS

A season with the king of the woods

by Ted Levin

I hadn't truly begun to know the pileateds until the day I finally found their nest. Oblong-cratered trees, chiseled by their great bills, were a familiar sight, and, like a bouquet of bloodroot in late April, their deep, loud drumming had been a dependable spring event; yet the birds themselves were still strangers to me. I found their nest in early May and that made all the difference.

The woodpeckers led me to it as they cavorted about the woods, chasing one another from tree to tree until one of the birds suddenly vanished, apparently into a dead elm. As I moved closer to investigate, a female pileated poked her head from a neat round hole about 18 feet above the ground. The nest cavity faced Blood Brook to the south, so the sun moving across the sky would warm the tree and help incubate her round white eggs. The muffled call of her mate wafted by, but instead of answering, she followed the noise with her eyes, lowering and raising her red crest. When she finally withdrew into the nest chamber, the elm seemed as lifeless as before she had arrived.

I set up a green nylon observation blind, and for 18 days watched the parent birds as they prepared for the arrival of their young. Unlike other North American woodpeckers, pileateds mate for life, and share the chores of warming and turning the eggs that lie nestled in wood chips in their lofty nest. Although the two birds took turns guarding the nest by day, the female departed each evening at twilight for a distant roosting hole somewhere on Spaulding Hill, leaving the nest to her mate's care. At dawn she would reappear, and temporarily relieved of duty, the male would then depart into the awakening woods.

Ineffably delighted, I crouched in the blind at dawn, awaiting the return of the mother pileated. The air was thick and redolent with brambles, and the brook's lilt muffled the sweet but monotonous phrases of a red-eyed vireo. As the morning warmed, fog dispersed and mosquitoes began to whine and bite; I slapped, pinched, flicked, and squeezed them, until I was forced to hold them at bay with reams of blue cigar smoke. Alternately lulled by the ambiance of bird song and preoccupied by mosquitoes, I waited.

By late May the birds had hatched. Their presence was indicated by a peculiar buzzing sound, more typical of a swarm of hornets or a congregation of bees. The elm seemed to vibrate with the noise. Lawrence Kilham, New England's most inveterate woodpecker watcher and author of *On Watching Birds*, suspects that these odd guttural buzzes made by the infant woodpeckers may serve to discourage raiding squirrels or raccoons, for what nest robber would choose to tangle with so many angry stinging insects? Once, I placed my ear against the trunk and listened to the tree resonate, a sound that I assume moved from the elm to the ground and sent ripples through the earth like a vibrating tuning fork touching water. I wondered if worms and moles heard—or felt—the low frequency serenade, the faint sound waves that radiated out from the base of the elm. The more the tree purred, the more I imagined.

Although the young woodpeckers were unable to reach the mouth of their cavity, about 12 inches above the floor, they knew when a parent drew near; their mumblings increased to an alarming volume each time a pileated swung past my view. Pandemonium broke loose as an adult reached the elm and began its vertical ascent to the nest hole. Tilting downward into the chamber, arching its stiff black tail feathers against the ceiling of the cavity, the parent would enter the nest, quivering violently as regurgitated ants, beetle larvae, and caterpillars slid down the throats of its anxious brood.

After each feeding the adult would disappear into the nest chamber for a minute or two and slowly emerge with its mouth crammed with membranous packets of feces, each twisted at the end, then inconspicuously slip into the woods to deposit the packets some distance from the nest. This procedure, which was faithfully performed, kept the nest and its young occupants clean and helped to eliminate odors that might lure hungry predators.

Before the era of market hunting, the golden age of wildlife slaughter, when even the pileated was sold as food, wildlife was not so shy. More than 200 years of persecution have increased most animals' flight distance, inviolable space that an

BHL

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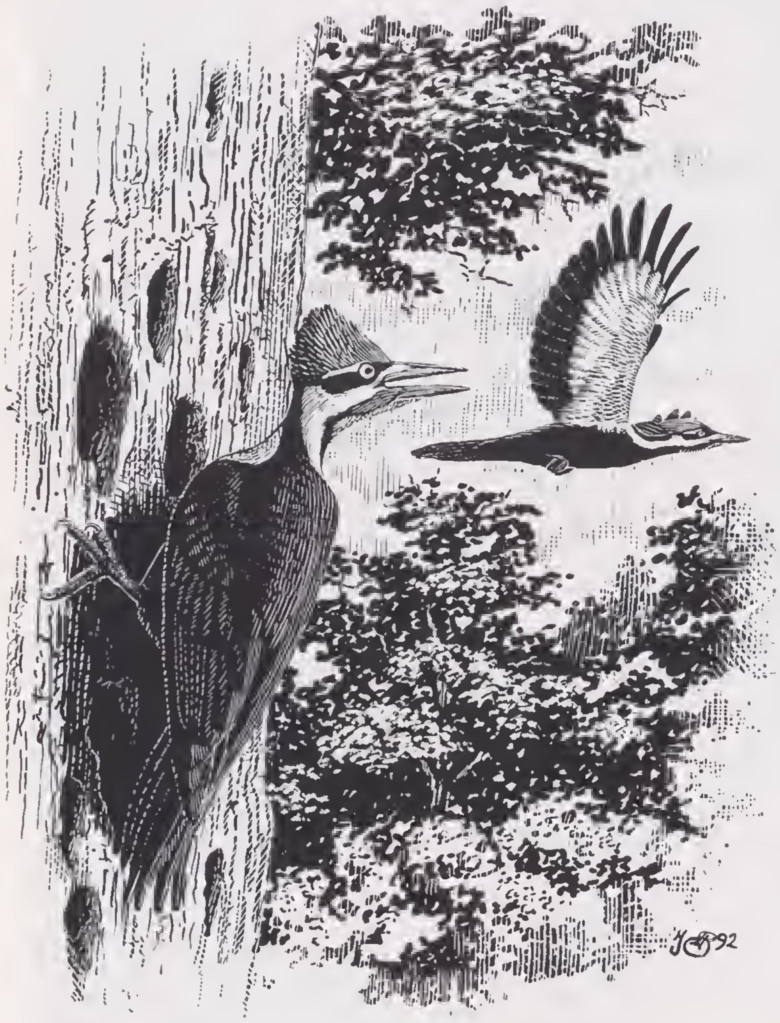
animal keeps between itself and another species. Whenever I find a wild mammal or bird along Blood Brook that permits a closer than usual approach as it goes about its daily business, I consider the event a gift. When I first found the pileated nest I squatted like a fugitive in the blind, 20 feet away. Slowly I moved the blind closer, a few feet a day, until I crouched 5 feet from the elm.



The young woodpeckers grew quickly, nourished with the copious harvest of insects provided by the adult birds, whose ability to detect carpenter ants was uncanny. Although early naturalists believed the strong formic acid smell of the ants attracted the woodpeckers, Kilham suggests that a visual clue—perhaps a shelf fungus or a canker—attracts the pileateds to an ant tree. It also seems likely that woodpeckers utilize sound. Repeated soundings along the side of the trunk, like those made by a prudent shopper testing a watermelon, would disclose the ant colony. However the detection is accomplished, I could see as I wandered through the valley that the heartwood of every stump and trunk the pileateds had chiseled with their powerful bills was laced with ant tunnels. Huge rectangular excavations more than a foot long, 4 or 5 inches wide, and as many inches deep laid bare the ant galleries. The adults returned to the ravaged ant trees 15 or 20 times each day. Harvesting the ants with their long sticky tongues, they returned to the nest to feed their young.

I saw the little woodpeckers for the first time during the second week in June. At that time two males, whose red crests extend to their upper bills, and a female, whose red crest stops at eye level, began poking their heads into the outside world, incessantly mimicking the calls of their parents. I watched as the adults, back from foraging excursions, strategically positioned themselves behind a large white pine. Hopping in and out of view, they tried to assess my intentions before moving to the nest. The screaming young birds jostled one another, nearly falling from the elm as they waited for their mother or father to thrust food deep into their throats.

For these birds, the nesting season was progressing smoothly, but food and nesting places have not always been so plentiful for the pileateds, the largest of 19 species of woodpeckers native to this continent, now that the larger and whiter ivory-billed woodpecker of southern bottomland forests is extinct in North America. (A small population of ivory-bills still bangs away in Cuban pinelands.) The pileated's domain once extended, unbroken, from northern British Columbia to Nova Scotia and from central California to southern Florida, but as forests shrunk to woodlots, pileateds, like the ivory-bills, disappeared from the countryside. By the 19th century, when most of the deciduous forest in the Northeast had been divided into farms and pastures, the big woodpeckers were scarce. Thoreau never saw one, and John Burroughs, whose nature essays were extremely popular around the turn of the century, never heard one.

Fortunately for the pileateds, land-use practices shifted. The abandonment of farms and the subsequent reforestation of fields meant that new homes and food sources were available, and the woodpecker population began to increase. As meadows became crowded with pine and maple and pastoral landscapes reverted to second-growth woods, more and more pileateds returned. Dutch elm disease offered the birds a pantry of carpenter ants and beetles, as well as numerous potential nesting sites. Once again, the woodpeckers' resonant drumming has become a familiar sound in early March, reverberating from dawn to dusk across much of their former range.

This drumming—its numerous powerful blows lasting several seconds, then quieting near the end of each roll—is perhaps the most familiar characteristic of the pileateds, and I noticed that the young birds instinctively began practicing their drumming soon after they had hatched. Muted though the sound was, the frequency and rhythm of their efforts were much like those of their parents. The pileateds' drumming serves several purposes: to announce territorial ownership, to attract a would-be mate, or to call a mate. Eventually the drumming of the young woodpeckers I watched would resonate from the dead limbs and hollow trees of Blood Brook valley, even from the metal roofs of houses and barns, but for now the young birds were content to tap their bills on the walls of the nest chamber.

By the third week of June the nearly full-grown young were perched precariously on the rim of the nest hole, filling the opening. Heralding their first flight, the parents began a duet that filled the forest with loud derisive laughter, like cries of the deeply disturbed. All afternoon the parent birds summoned, while the young birds listened and

ILLUSTRATIONS BY JOHN SCHMITT

watched, gathering courage to jump, like kids preparing to enter a cool lake. Lured by the relentless *cuk*-ing calls of their parents, the young birds leaned toward the beckoning forest, and on the morning of the summer solstice the first two birds took flight. The third followed the next day.

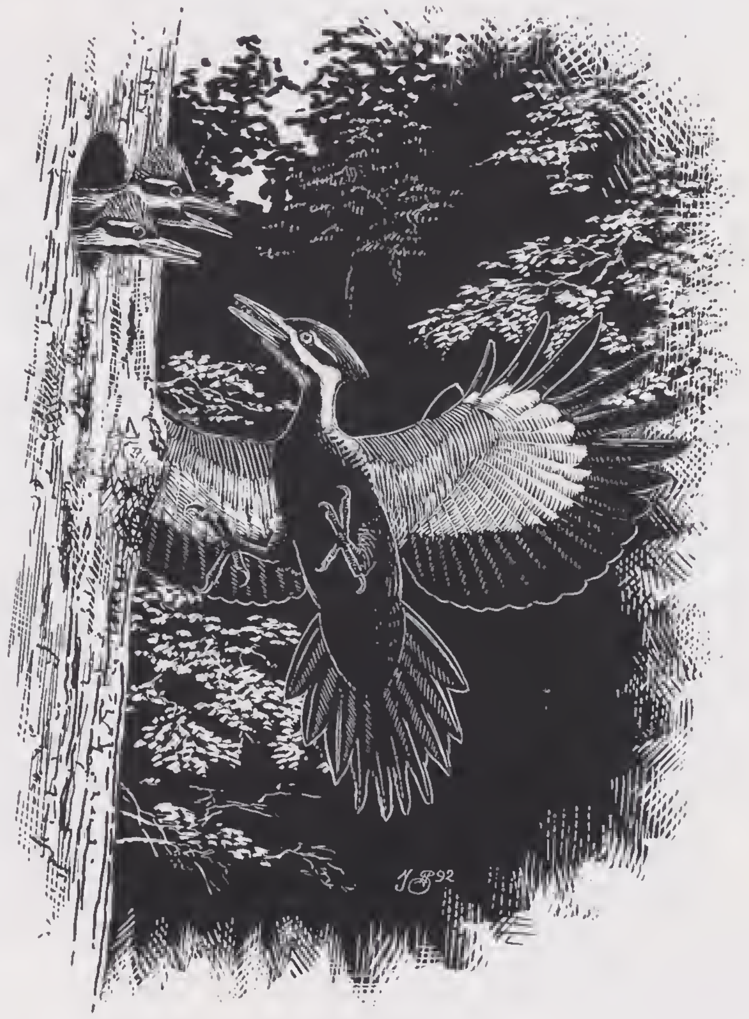
During the next several weeks I could see the young in the vicinity of the elm, fluttering through the woods and across the meadow as they plaintively begged for food. Their parents faithfully tended to their needs, leading them to ants, teaching them the art of finding beetle larvae under tussocks of moss, and instructing them in the proper techniques of eviscerating the rotting stumps on the slope above the driveway. Once, two young woodpeckers and a parent, like a tercet of pterodactyls, crossed the meadow below Blood Brook, their stiff wings flashing white, crests backlit and flaming. They flew into the front yard maple and perched on the trunk in view of the window, squabbling and chasing, then disappeared into the woods on the west side of the house.

With time the young birds became more independent. By autumn their apprenticeship was over, and they traveled unescorted to the wild arbors of grape. As the days grew shorter and colder the pileateds began consuming quantities of clustered dogwood fruits, racemes of cherry, and poison ivy berries, eating their fill before the hordes of migratory birds could strip the woods bare of its remaining fruits.

Pileateds eating fruit were a comic sight. They would grasp the spindly branches and hang upside-down, parrotlike, screaming wildly as though in distress and consuming one piece at a time. Kilham believes the birds are vulnerable in these positions, and that their excited cries are a ploy to deter potential predators—goshawks, Cooper's hawks, peregrine falcons, or, if they forage near the ground, bobcats, fishers, coyotes, and foxes. Humans too, were once a predator of the woodpecker. The Huron Indians adorned their calumets with pileated crest feathers and made necklaces from their huge bills. At one time the birds were even sold in the markets of large eastern cities, but Audubon found the meat tough and smelly, and Major Charles Bendire, writing in 1895 about birds for the U.S. National Museum (the precursor of the Smithsonian Institution) found pileateds "a very unpalatable substitute for game of any kind," despite "any amount of seasoning and cooking."

Although market hunting no longer endangers the species, rapid deforestation again threatens the pileateds' food supply and nesting sites. As my neighbors remove standing dead timber, the young woodpeckers find the resources critical to their survival growing scarcer. Some foresters and recreation managers are well aware of the threat. The U.S. Forest Service has established a policy in western national forests that requires loggers "to provide habitat needed to maintain viable populations of cavity nesting wildlife." To the chagrin of some woodcutters, the Forest Service advocates that selected trees which might otherwise be taken for firewood be left standing for cavity nesters. My neighbors, I hope, will understand, and thin their woods selectively, leaving a few trees per acre for the pileateds, especially dead elms.

For as winter approaches, each of the woodpeckers must find a separate roost hole to shelter it from the prevailing winds. The pileated has no need to migrate, because its principal food supply is well insulated and accessible all winter. The male I had been observing appropriated the old nest hole, returning each evening alone, while his mate excavated another hole about a half-mile away. The young birds had to travel, for not only did they need roost holes, they also had to find territories that would supply them with food. They were no longer tolerated in the valley, and at times they were driven from the neighborhood by their parents.



By next March, in a cranny of Blood Brook valley, a young pileated will sound its drum, only barely audible from here. Perhaps it will be calling a mate it has never met or merely answering the echoes of its parents. I will search for the nest, for proximity to wildlife is an elixir: a chance to sit still and watch, to while away the hours in the name of natural science, to lose myself again. For me, watching wildlife is what Ponce de León searched in vain for, a fountain of youth. ■

Writer and photographer Ted Levin watches woodpeckers in West Fairlee, Vermont, where he is a naturalist for the nearby Montshire Museum. The author of Backtracking: The Way of a Naturalist, *Levin has just completed a new book about his home territory,* Blood Brook, *which is scheduled to be released by Chelsea Green Publishing Company this September. "Vigil with Pileateds" is excerpted from* Blood Brook *with the permission of the publisher.*

SINKING in the SHAWNEE

by Jerry Sullivan

The wood thrush nest looked like a clump of flood debris stuck in the fork of a beech sapling. It was less than 8 feet off the ground, not high for the species, but too high for any of us to see into—we had forgotten to bring our mirror poles. I squatted down, and Suzanne Kircher climbed onto my shoulders. When I stood up, she pulled the sapling slightly toward her and looked into the nest.

"Three host eggs," she said. "And two cowbird."

We were standing in a narrow, densely wooded ravine. The trunks of tall sugar maples, beeches, tulip trees, sycamores, and several kinds of oaks supported a canopy that threw the forest floor into deep shade. We were at least a quarter of a mile from the nearest road, a gravel track barely wide enough for two-way traffic.

"Only two cowbird," Rob Olendorf said. "That's not bad."

Two cowbird eggs is not bad? In this deep-woods nest—far from the farmland, fields, and woodland edges that are the traditional habitat of the brown-headed cowbird—40 percent of the eggs are parasites, and that is "not bad?"

Well, yes. It's not bad considering where we are, in the Shawnee National Forest. Here in deepest southern Illinois, the average wood thrush nest contains almost twice as many cowbird as wood thrush eggs, and some pairs of forest-interior birds raise broods that are nothing but cowbirds. We know this distressing fact thanks to a massive, multiyear study of the nesting success of neotropical migrant forest-interior birds being conducted by Scott Robinson of the Illinois Natural History Survey.

Both Rob and Suzanne are foot soldiers in Robinson's small army of student workers. Toiling for burger-flipper wages in a climate that makes you feel like you are standing under the exhaust vent of a clothes dryer, they rise at dawn to spend long days finding and monitoring nests and banding birds. After three years in the field, Robinson's army has generated a data set that tops almost everything else available by a factor of three or four.

And what the data reveal is a mostly bleak picture of low reproductive success in many species of neotropical migrant forest-interior birds. The wood thrush provides the most dramatic horror story, but many other species, among them cerulean and hooded warblers and red-eyed and yellow-throated vireos, are also in trouble. The populations of all these birds seem far below the carrying capacity of the environment.

Their problems most likely stem from forest fragmentation, a process that exposes these birds of the forest interior to the hazards of life on the edge—high rates of predation and brood parasitism. Nothing in the evolutionary histories of these birds has prepared them to face these hazards. They lack the defensive strategies of such edge species as the gray catbird, which removes cowbird eggs from its nest. And the onslaught could wipe them out.

I spent a few days last May following the nest

Are neotropical migrants doomed to raise cowbirds and die?

Casually tossing aside a chestnut-sided warbler's egg, this brown-headed cowbird is about to lay an egg of her own. The undiscriminating warblers will incubate the egg, feed the oversized cowbird nestling until it fledges—and think they have had a successful breeding season.

HAL H. HARRISON (GRANT HEILMAN)

hunters through the forests of the Shawnee. We found a worm-eating warbler nest built on a stream bank deep in a wooded ravine that contained two warbler eggs and a cowbird egg. We found more wood thrush nests, also parasitized by cowbirds, and nests torn to shreds by raccoons and opossums, which also invade forests along edges. It was a small contribution to Robinson's steadily accumulating body of data, a mass of information that has been surprising its collectors since the work began in 1989.

SCOTT ROBINSON (2)

The Shawnee project grew out of a study Robinson began in 1985 at Lake Shelbyville, south of the city of Decatur in central Illinois. Robinson describes the landscape around the lake as hacked up beyond belief—cornfields and houses and scattered woodlots, none of any size. Wood thrushes nested in the woodlots but when he surveyed the nests he found astonishing parasitism rates—as many as 12 cowbird eggs in one nest, and many nests with nothing but cowbird eggs.

The wood thrushes at Lake Shelbyville were raising cowbirds. Robinson concluded that he had discovered a population sink, a place where wood thrushes came to nest, to raise cowbirds, and to emigrate or die without passing along their own genes. But if Lake Shelbyville was a population sink, where were its forest birds coming from? The Shawnee National Forest, the nearest large wooded area, seemed the most likely place to look.

The Shawnee is small as national forests go. The land within its boundaries totals nearly 840,000 acres, but only about 265,000 acres are actually owned by the U.S. Forest Service (USFS). The rest of the land is controlled by other public agencies or by private owners, and it includes not only forested land but cornfields, factories, even whole towns.

Still, it holds the largest tracts of forest in Illinois. If there is anywhere in the state where birds of the forest interior can escape edges, this should be it. Robinson hoped that a study of forest-interior birds in the Shawnee would reveal what the various species need to thrive. "I thought it was going to be a simple matter of distance to edges, extent of the edge, and size of the tract," Robinson says. "I hoped to develop a series of local management recommendations for improving bird productivity in the forest by minimizing edges."

But as the data began to accumulate—as Robinson and his army combed the woods seeking the nests of wood thrushes, Kentucky, hooded, worm-eating, and cerulean warblers, summer and scarlet tanagers, and Acadian flycatchers—a picture began to emerge of pervasive parasitism and high predation, of a landscape that was all edges. Not all species were equally affected, however. Although the wood thrush seemed to be heading for a catastrophe, the worm-eating warbler—a species that is extremely sensitive to landscape fragmentation in the East—was doing rather well. So was the Kentucky warbler, although neither species was as successful as other studies had shown it to be in large tracts. The study had begun as a way of measuring edge effects and finding ways to minimize them, but the data were raising some complicated questions about which species were doing well and what kinds of places they did well in.

After my morning with Rob and Suzanne, I tagged along with Lonny Morse—a graduate student whom Robinson describes as a genius in the field—while he searched for a hooded warbler nest. These are real prizes, rarely found. In the Shawnee, hooded warblers favor blowdowns and other disturbances within the forest, where the ground is thick with dead logs, young trees, and the opportunistic plants that colonize these islands of sunshine (poison ivy, for example). We searched through a long, hot afternoon, combing thickets where male hooded warblers had been heard singing. But long, slow searches and even longer waits in and around all this tangled stuff did not produce a nest.

The best nest finders average about one nest for every two hours in the field. According to Robinson, finding nests is so difficult that it has retarded research into the population dynamics of forest birds. "Studying forest birds is too labor-intensive. The nests are hard to find; the territories are large and spread out; and it's dark and shady and hard to see." Robinson's graduate students, the grunts of American science, have overcome the problem by spending an enormous number of person-hours in the field. They work like dogs for the fun of it, for the field experience, and to pursue their own research.

Scott Robinson's work crew numbers about 20 at its maximum size. They live in an old Youth Conservation Corps (YCC) camp, a decaying collection of cabins with interior walls and floors of unpainted plywood. The mess hall is the center of camp life. It's a place for eating and for hanging out, for meeting and for filling out the forms that record what you accomplish each day. An aquarium in the corner holds an ever-changing cast of snakes, lizards, and tadpoles that somebody has brought in from the woods for everyone to see. (They're eventually returned to the places where they were found.) The overall atmosphere is science camp with real science.

Evenings the mess hall is where we talked about movies, and rock and roll, and birds, and just exactly what we were going to be doing the next day. Evenings were when I had a chance to get a detailed report from Robinson on the progress of this vast project.

We started by talking about the complex, fragmented landscape of southern Illinois. The local topography includes clumps of low, forested hills with narrow ridges and steep-sided ravines. Between the ranges of hills, the land is either rolling or very flat. The Mississippi River is just a few miles west of Robinson's research site, and the Ohio joins it one county south. On some of the flat lowlands are oxbow lakes and a few cypress swamps that have escaped the plow and the axe, but most of the land is given over to farming.

"The landscape was naturally fragmented," Robinson said, "luxuriant, dense forests where it was wet, down by the rivers, and on the dry ridgetops fires left a kind of open forest. Agriculture has been the major form of human-caused fragmentation, but even within the forests, the land has been deliberately carved up. Until recently, forestry practices involved clear-cutting, which creates 15- to 25-acre gaps in the forest. And traditional wildlife managers created more openings, reasoning that breaking up the habitat was good for game animals such as deer and turkey.

"All these things were happening simultaneously in a landscape where there weren't any huge tracts to begin with. If you look at a map, you can see the forest is really a series of interconnected patches with openings in between. It's a complex landscape in which no area is large enough to escape the negative effects of edges: high predation and high brood parasitism."

When he began to study the Shawnee, Robinson expected to find that agricultural openings would be worse than clear cuts, that cowbirds would stick close to pastures and raccoons and opossums to cornfields. But he discovered that the type of forest gap was irrelevant. "We are absolutely full with all those animals, especially cowbirds. They are at saturation level."

My own brief experience as a nest hunter convinced me of the truth of his observation about cowbirds. Driving along the narrow gravel road through the Pine Hills, we scared up lots of them feeding on the shoulder. They were far more common than robins or grackles or red-winged blackbirds. In the woods they perched on every tall snag. "We are always being watched," one nest finder told me. Cowbirds seemed to use the same techniques we used to find nests, and I worried about whether we were leading them to the nests we found.

I returned to the Shawnee in early July as the season was winding down. I spent a morning with graduate students Doug Robinson and Leslie Jetté in a ravine in the Trail o' Tears Forest, a state-owned tract that borders the Shawnee. They were working a line of 10 mist nets scattered along the dry creek bed. We captured and banded Acadian flycatchers, Kentucky and worm-eating warblers, a Carolina wren, and a Louisiana waterthrush that had already been banded. Lines of nets like these at various locations in the study area can provide another measure of reproductive success as well as an indication of how many birds are returning to this site to breed. I also spent a day sifting through the piles of nest logs looking for an overview of what was happening in the Shawnee. For the wood thrushes, the picture seemed bleak. Eighty-nine nests had been found. They contained a total of 115 wood thrush eggs and 198 cowbird eggs, just 1.3 wood thrush eggs per nest—before the predators got to them. And the predators were very active. The reports were filled with depressing accounts of "no adults," "broken eggshells on ground," "nest empty." Or this poignant note on a Kentucky warbler nest: "female dead 3 feet from nest; some feathers scattered, beak fractured in nasal area, hole in breast. Eggs intact." Reading the stack of nest

The small army of dedicated students working in the Shawnee National Forest has generated a gold mine of information on forest-nesting neotropical migrants. Immune to the poison ivy that festoons this tree (far left), Steve Bailey uses a mirror pole to scope out a lofty nest. Robinson's crew also runs lines of mist nets; above, Rob Olendorf measures an already-banded bird.

How the East Was Overrun

Ornithologists agree that forest fragmentation has allowed brown-headed cowbirds to parasitize forest-nesting songbirds at ever-growing rates. The story of how cowbirds came to be such a menace to birds of the eastern deciduous forest, however, goes far back into the history of this continent.

Brown-headed cowbirds are grassland birds—they prefer open habitats to forests. Prior to the European settlement of North America, cowbirds were largely restricted to the midwestern prairies and Great Plains, where they associated with bison and other large grazing animals, feeding on the insects stirred up by the nomadic herds.

HAL H. HARRISON (GRANT HEILMAN)

This rare portrait catches a female cowbird in the act of egg laying. Because cowbirds don't need to care for their young, they can lay huge numbers of eggs. Each female is capable of laying up to three dozen eggs per year.

Over millennia, cowbirds and the birds in whose nests they laid their eggs coevolved. Grassland hosts such as bobolinks and meadowlarks developed strategies for thwarting the parasites—driving them away from their nests, recognizing and ejecting cowbird eggs, and abandoning nests if parasitism was persistent. These defenses reduced the impact of cowbird parasitism to the point where cowbirds and their hosts achieved a sort of equilibrium.

All that changed in the 18th century when settlers began opening the eastern deciduous forest to plant crops and make pastures for domestic livestock. Quick to take advantage of an ecological opportunity, cowbirds colonized these pockets of habitat. The eastern cowbird population has been growing ever since.

Jared Kirtland, best known as the discoverer of the Kirtland's warbler, recorded the rapid expansion of the cowbird population in the 19th century. When he documented the birds of Ohio in 1838, he noted that "the cow-bunting [brown-headed cowbird] is admitted into our catalogue on rather doubtful authority." Just 26 years later, however, Kirtland described cowbirds in Ohio as "abundant, formerly rare."

This rapid eastward expansion brought cowbirds into contact with many birds that had never experienced brood parasitism. The naive hosts had few defenses and were easy to parasitize. Forest songbirds were the most vulnerable, especially warblers, vireos, thrushes, and flycatchers.

Because they are open-country birds, cowbirds penetrate forest cover only as far as they must to find nests. Most female cowbirds parasitize songbird nests near the edges of the forest, and few venture deep into the alien woods. So although forest songbirds regularly experience brood parasitism, nests deep in the interior are less vulnerable. As development has carved once-extensive forests into small isolated woodlots, however, more and more songbirds nest within reach of cowbirds.

As bad as this situation sounds, things have been getting worse. Until early in this century, cowbird numbers in the East stayed relatively low. Cowbirds are migratory, moving south in the winter to areas where their populations were limited by severe overwinter food shortages.

Modern agricultural practices changed that. In the 1930s, a tremendous expansion in the acreage of cereal crops, especially rice in the Southeast, resulted in abundant overwinter food for cowbirds. Populations exploded. More and more cowbirds survived the winter each year, to migrate northward and parasitize nests come spring.

Today, eastern cowbirds have everything going for them. During the breeding season they have easy access to naive hosts. Each female cowbird can lay up to three dozen eggs, and rice fields ensure good overwinter survival. No wonder cowbird numbers have skyrocketed.

As a result, female cowbirds now compete intensely with each other for nests to parasitize. This competition drives them deep into the forests, looking for hosts. In some regions of the Midwest, where forest habitat is severely fragmented and cowbirds are especially abundant, no refuge is large enough to deter cowbirds.

Why haven't forest songbirds learned to fight back? Defensive strategies evolve slowly because basic parental behaviors must be altered. Ejecting eggs from the nest and abandoning begging young are actions that are contrary to strong parental drives. Eastern birds will evolve defensive mechanisms eventually, but for the time being, cowbirds will continue to exert a strong effect on the dynamics of forest songbird populations.

What about controlling cowbird numbers? This strategy has been used in a few local situations, such as the limited habitat where the endangered Kirtland's warbler breeds. But in general killing cowbirds is a tedious and largely ineffective activity. Short of denying cowbirds winter food—and the necessary agricultural changes to accomplish this are unlikely to occur—cowbirds will remain an abundant menace to eastern deciduous forest songbirds.

—Stanley A. Temple

logs left me feeling that the lives of wild birds are so hazardous it's a miracle any of them survive.

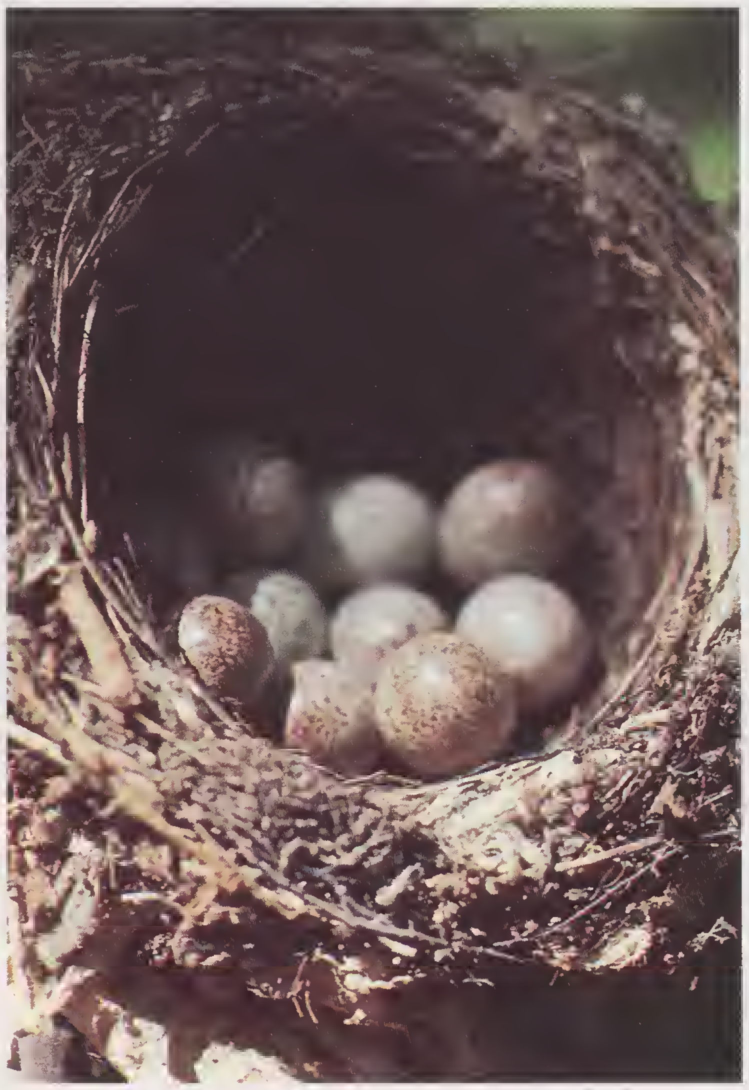
Eighty-nine wood thrush nests *were* discovered in the study area, however, so the birds have not completely vanished. But according to Robinson there are not enough birds to fill the available habitat. "Species like the wood thrush and the red-eyed vireo tend to gather in clusters," Robinson said, "leaving large areas of apparently suitable habitat with none of these birds. On the other hand, yellow-throated vireos seem to spread out through the forest, so they are uncommon but present in all suitable habitat. Cerulean warblers seem to be in real trouble, and one of my students, Glendy Vanderah, is investigating the bird's habitat needs. We see very small numbers, far less than the habitat could support."

The study is also beginning to clarify the effects of both predation and brood parasitism. Heavy predation reduces populations by driving birds away. They will not return to an area if their nests are repeatedly destroyed. Birds will, however, return to a place where they raised nothing but cowbirds the previous year, presumably because they think they had a successful breeding season. If heavy parasitism continues, the population will eventually crash unless new birds come in from somewhere else. The cluster of wood thrushes at Dutch Creek, Robinson's study area nearest the YCC camp, has already crashed, dropping from 20 nests the first year of the study to two last year.

Further details will have to await a more extended analysis of the data and what Robinson hopes will be another year of study. "A five-year study will level out some of the year-to-year variations and give us a clearer picture," Robinson said. He fears the picture will be a glimpse of the future everywhere in eastern North America as habitat continues to be fragmented.

Meanwhile, many people are anxiously awaiting his results. Logging in the Shawnee has been a controversial issue for many years, with lawsuits and demonstrations. People on all sides of the issue are looking for definitive statements about how the forest should be managed. So far Robinson is not prepared to make many definitive statements. He can say that for forest birds, clear cuts in his study areas are disasters for the first decade or so after logging. Only after 10 years of growth do the birds reinvade the space. In recent years the USFS has stopped clear-cutting in his study areas in favor of selective logging.

At this point, Robinson says, "I feel confident in making two recommendations. First, although no tracts in the Shawnee are presently large enough to provide protection from edge effects, some places would be large enough if land were purchased strategically and if the clear cuts and wildlife openings were stopped. Second, we should recognize the global importance of the larger national forests, those that have big tracts, and preserve them." If we don't, the sweet spring song of the wood thrush may no longer be heard in our woodlands. ■



SCOTT ROBINSON (2)

Above, expert nest finder Lonny Morse stands knee-deep in a stream as he checks the nest of a Louisiana waterthrush. The Shawnee study documented astonishing cowbird parasitism rates. For example, the wood thrush nest at left holds only cowbird eggs.

Jerry Sullivan writes a column called "Field and Street" for the Chicago Reader *and is currently helping to organize surveys of nesting birds in the remaining natural areas in northeastern Illinois.*

THE UGLY

TIM GALLAGHER

The unsavory truth about a beautiful collector's item

THE CORNELL LABORATORY OF ORNITHOLOGY

An International Center for the Study, Appreciation, and Conservation of Birds

Annual Report 1991-1992

SOARING INTO THE FUTURE

At the Cornell Lab of Ornithology, the egg comes before the chicken. That is to say, we need a healthy nest egg to hatch our plans for the future.

At our Capital Campaign kick-off in May 1991, Ned Morgens, our board chairman, peered into our version of a crystal ball—an oracular "nest egg"—to probe the Lab's future.

What did Ned see inside the egg? He winced when he saw declining North American songbird populations and other serious bird-related issues of global significance. He brightened when he saw bird conservation partnerships emerging between federal, corporate, and private organizations. He beamed when he witnessed the loyal commitment from Lab members who support our conservation, education, and research programs. He saw the Lab soaring into the future.

Now, 16 months later, what has our nest egg produced?

- Thanks to you, our 14,246 members, we are off to a great start—two birds hatched and fledged! Since we first peered into that oracular egg, we raised enough funds ($5 million) to fully endow two Lab faculty-level positions. The Edwin H. Morgens Professor of Ornithology, a new position in Bird Population Studies, is soon to be filled by a world leader in ornithology. The Louis Agassiz Fuertes Directorship endows the position held by our executive director, Charles Walcott. Both positions are key to the Lab's effectiveness and long-term stability.

- Partners in Flight, a neotropical migratory bird conservation initiative, took shape in 1991. This innovative program, started by the National Fish and Wildlife Foundation, links organizations from the profit, nonprofit, and governmental sectors together with a common goal: to implement a coordinated recovery program for our migratory birds. Lab staff in Education and Information Services, Bird Population Studies, and the Library of Natural Sounds are lending their expertise to promote this vitally important initiative.

- The National Science Experiments, educational/research programs that involve volunteers in bird study and conservation, were launched in 1992. Under the direction of the Lab staff, with guidance from outside organizations and funding from the National Science Foundation, three experiments are now under way. The National Science Experiments are far reaching, involving children from inner cities, feeder watchers from rural and urban areas, and advanced birders from all over North America.

- Project Aves, a novel elementary and middle school curriculum developed in partnership with the Roger Tory Peterson Institute, was launched in 10 school systems. The project is designed to involve students and their teachers in scientific bird studies. In its pilot year, Project Aves met with great success. The next steps are to develop a national program, a network of bird-watching students and teachers linked together via an interactive telecommunications system.

- Canary, a powerful new computer software package for studying animal communication, was released from the Lab's Bioacoustics Research Program. Canary promises to catapult the study of bird communication into a new realm of understanding.

Forecasting the future, chairman of the board Ned Morgens (left) peers into the Lab's oracular egg with Cornell vice president John Wiesenfeld.

In addition to these highlights, the Lab continues to support a variety of ongoing projects and services. The Library of Natural Sounds (LNS) released a new edition of the "Peterson Field Guide to Western Bird Songs," with 30,000 cassettes produced and manufactured here in our studios. Other LNS releases included "Voices of the Cloudforest," "Birds of Eastern Ecuador," "Bird Songs of Belize, Guatemala, and Mexico," and "Ocean Voices of the Alaskan Arctic." Our radio program, "BirdWatch," reached 2.8 million listeners each week. *Living Bird* magazine continued to excite and inform readers—and received several awards as a premier university magazine. And as always, the Lab was the crossroads for many thousands of visitors, whether in person, on the telephone, or by mail.

Will the Lab continue to soar in 1992-93? With your continued support and assistance, we will. Many more chickens will hatch out of our nest egg—but we won't count them till they hatch.

—Scott Sutcliffe, General Director
Cornell Lab of Ornithology

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1991-92 FINANCIAL REPORT

In 1991-92 the Lab showed a surplus of revenues over expenses.

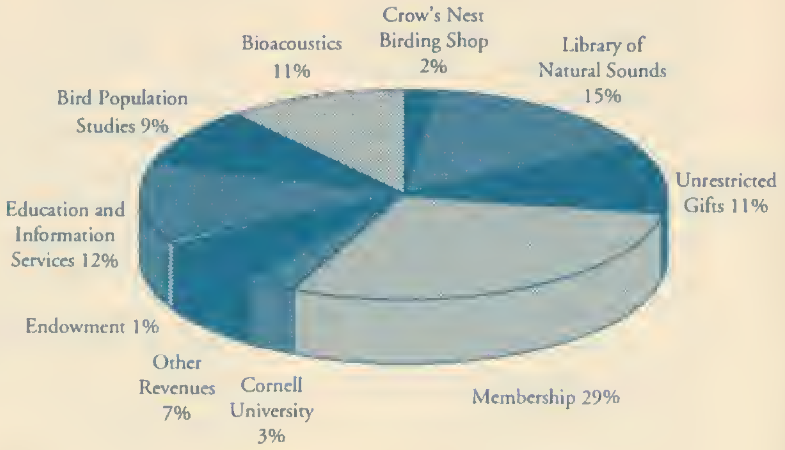
Gifts from members increased by 7 percent. Crow's Nest Birding Shop revenues increased by 30 percent, and program income showed substantial advances. Of special note were dramatic increases in birdsong cassette production and user service income in the Library of Natural Sounds.

Overall 1991-92 expenses showed a modest decrease from the previous year. The only unexpected increase was the cost of operations, a result of unbudgeted repairs to our facilities and unanticipated adjustments in staffing. Other increases in program expenses were balanced by additional program income.

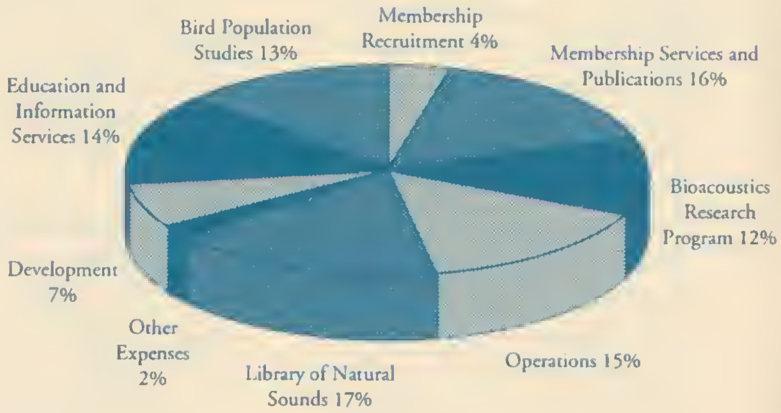
Membership and unrestricted revenues paid for all membership, development, and operational costs. The balance ($212,000), combined with program income, was used to support the Lab's research, conservation, and education programs.

	July 1, 1990-June 30, 1991	*July 1, 1991-June 30, 1992*
INCOME		
Membership	$ 587,748	$ 625,053
Unrestricted Gifts	229,191	249,584
Investments	29,837	29,380
Cornell University Subsidy	65,325	77,629
Crow's Nest Birding Shop:		
Income after expenses	30,370	39,383
Library of Natural Sounds	364,110	351,188
Bioacoustics Research Program	328,341	255,501
Bird Population Studies	296,371	211,651
Bird Navigation Program	45,401	6,784
Education and Information Services	100,104	275,956
Miscellaneous	293,359	160,952
Total	$2,370,157	$2,283,061
EXPENSES		
Membership Services and Publications	$ 375,925	$ 371,545
Membership Recruitment	84,218	92,678
Development	137,261	170,919
Operations	300,502	334,279
Library of Natural Sounds	432,838	391,830
Bioacoustics Research Program	328,341	270,501
Bird Population Studies	377,100	297,414
Bird Navigation Program	45,401	6,784
Education and Information Services	112,104	313,403
Miscellaneous	176,190	32,981
Total	$2,369,880	$2,282,334
Excess (deficit)	$ 277	$ 727

SUPPORT AND REVENUES, 1991-92



EXPENSES, 1991-92



SALMON FLY

by Ted Williams

Which of the beautiful flies above hides an ugly secret? The "Jock Scott" at the far left is a virtual potpourri of rare bird feathers. The others are made with common substitutes. The current fad of collecting salmon flies made from exotic feathers called for in 19th-century fly patterns presents a real danger to several endangered birds.

On a bright September morning fragrant with willow and woodsmoke I stood in Sutter's Pool on New Brunswick's Southwest Miramichi while Bill Hooper, the province's top salmon biologist, coached me from the bank. Weightless as a moonwalker, I danced downriver over smooth gravel. Finally, I planted my boots and leaned into the current, feeling the cool flow pile around my chest waders. A raven croaked, a flight of mergansers shot by a foot above the surface mist, and where my fly sliced the silver wavelets a copper-hued Atlantic salmon breached.

No one knows why the "King of Fish," as Izaak Walton christened the species 340 years ago, strikes a fly. Whatever the reason, it is not hunger—adult salmon returning from the sea to their natal rivers don't feed in fresh water. Lee Wulff, the author/angler who studied and championed Atlantic salmon from the 1940s until his death last year, suggested that they retain a behavioral imprint from their freshwater youth when they gorged

Renowned fly tyer and author Poul Jorgensen, above, may have unwittingly started the fly collecting craze by publishing a book on salmon flies in 1978. He now encourages fly tyers to substitute feathers from chickens, turkeys, and ducks in their salmon flies.

on insects before dropping down into salt water.

"Try this," declared Bill when the fish had bulged under my fly for the third time without taking. From his box he extracted a "Green Machine." Basically, it's a plug of compressed deer hair that resembles the filter of a cigarette smoked by a woman wearing chartreuse lipstick. Even its advocates, of which I am one, readily admit that it is among the ugliest lures ever concocted—right down there with the grape-flavored, plastic bassworm.

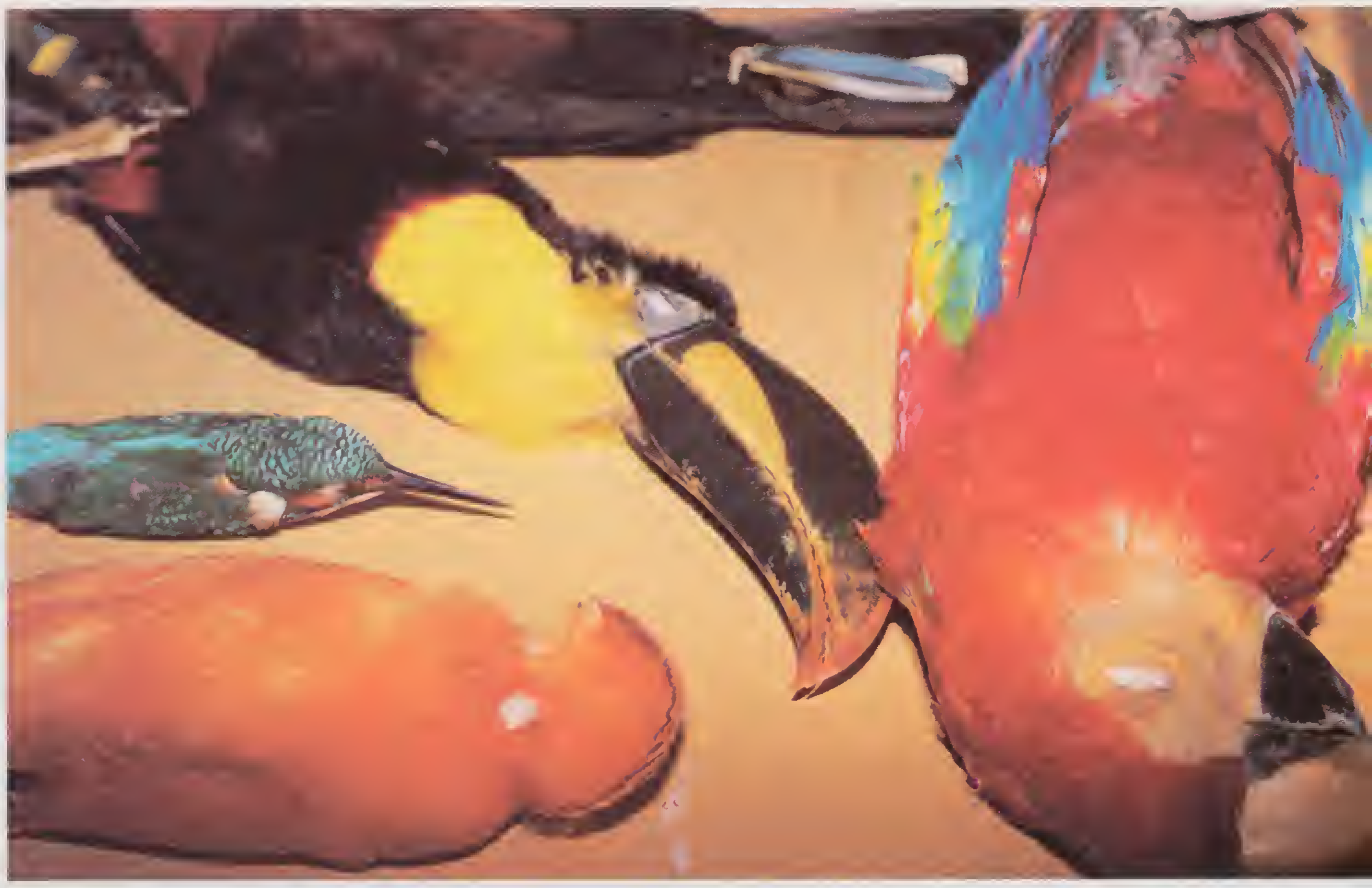
Painful though it is to admit, the truth is that the King of Fish doesn't quit with the cigarette-butt look-alikes; he has been observed taking the genuine item! Also twigs, gum, and bottle caps. Such bad taste makes a farce of the current obsession among salmon anglers with the elaborate and gaudy fly patterns popular in Victorian England. Frequently, these are tied with feathers from rare birds (as per the original recipes) and therefore can sell for several hundred dollars apiece. God forbid that anyone fish with such creations. They are considered artwork. You encounter them not in fly boxes or hatbands, but pressed under glass inside fancy hardwood cases in smoke-scented dens. I know one tyer who, in one transaction, sold three for $4,000.

Tyers of trout flies are constrained by natural law, for it is their task to "match the hatch" by imitating trout food—a moth, a gnat, a mayfly. But, there being no such thing as riverine salmon food, salmon-fly tyers are constrained only by whim and fancy, spinning out patterns that resemble nothing that ever flew, crawled, or swam. For instance, only over the fairy skaters' lake in *Fantasia* might one expect to observe a hatch of the stunning indigo, red, gold, black, white, silver, and gray salmon fly known as "Baron" which, when "traditionally tied," requires feathers of ostrich, Indian crow (fruitcrow), European jay, golden pheasant, swan, peacock, blue chatterer (cotinga), grey junglefowl, blue macaw, mallard, and mandarin duck.

When these and other gaudy flies first came to England, where drab patterns had been in vogue since the 15th century, they were scorned as "the Irish fly" and even banned on such hallowed water as the River Tweed where they were declared "a kind of bugbear to the fish, scaring them from their accustomed haunts and resting spots."

Although Victorian salmon flies have been collected in America for years, the fad for "authentic" material started in 1978 when Poul Jorgensen, arguably the most famous living salmon-fly tyer, published his handsome volume, *Salmon Flies, Their Character, Style and Dressing*. "I researched and wrote up a lot of substitutes for these feathers—turkeys, chicken, duck," he explains. "But some of the guys just went wild and started hunting down these rare feathers—tried to get them any way they could."

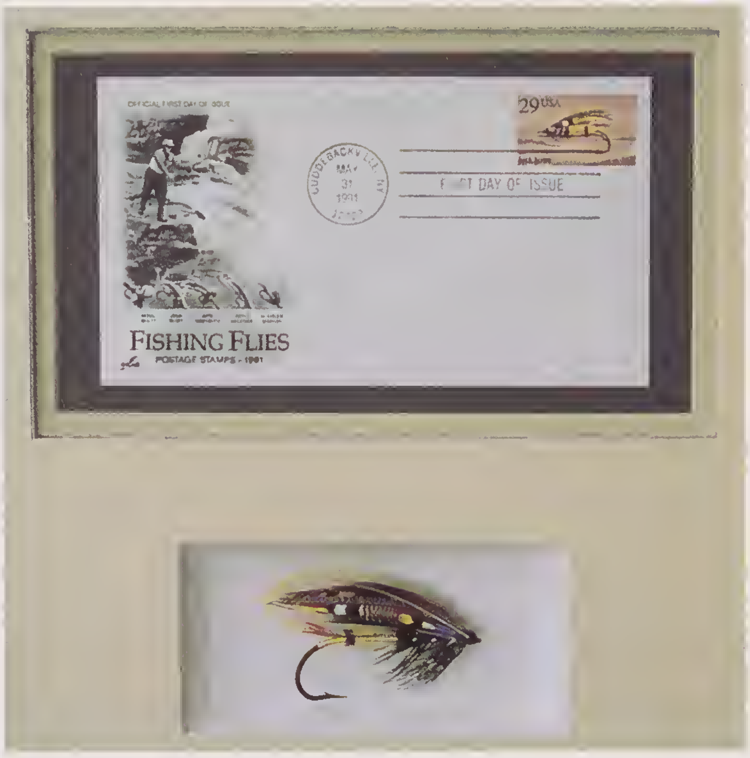
In her just-published book, *The Atlantic Salmon Fly—The Tyers and Their Art*, Judith Dunham writes: "The need for such feathers as raw materials seems only superficially to explain the compulsion to collect them. Like the passion to own unique and priceless jewels, there is among many Atlantic salmon fly tyers a desire to possess rare feathers, a desire for ownership that seems to run deeper than the mere accumulation of them as inventory. It is as if the feathers are still imbued with the life force of the birds they once cloaked."



Which is fine and dandy except for some of the decloaked birds. For my part, the Green Machine is a bird of paradise when you set it alongside, say, a Jock Scott tied with blue chatterer. Also called cotingas, blue chatterers are jungle jewels about which not much is known. Only males chatter, and then, apparently, only with their outer primaries as a flight display. Otherwise these diminutive birds are silent and secretive, ghosting over dwindling neotropical rainforests at elevations that make them nearly impossible to study, nesting high in the canopy, flashing briefly over a burned clearing, appearing out of nowhere to feed on fruit, vanishing just as suddenly.

Of the seven species of blue chatterer commonly called for in the old recipes, none look to be in great shape, and one—*Cotinga maculata*—is listed as endangered by the U.S. Fish and Wildlife Service (USFWS) and appears on Appendix I (the most critical designation, proscribing export) of the Convention on International Trade in Endangered Species (CITES).

TIM GALLAGHER (3)



The gaudy Jock Scott salmon fly pictured below, framed with a U.S. postage stamp that honored this traditional pattern, is tied entirely with "original materials." Above, some of the materials called for in 19th-century salmon fly patterns.

If egret plumes were inappropriate for ladies' hats at the end of the 19th century, how is it that blue chatterer feathers are okay for decorative salmon flies at the end of the 20th century? Other traditional salmon-fly ingredients include scarlet macaw (Appendix I), blue-and-yellow macaw (Appendix II, a CITES designation that forbids export without permit from country of origin), cock-of-the-rock (Appendix II), keel-billed toucan, red-ruffed fruitcrow, Eurasian kingfisher, scarlet ibis (Appendix II and protected under the Migratory Bird Treaty Act), grey junglefowl (Appendix II), and great bustard (Endangered and Appendix II).

Most of the material currently going into Victorian salmon flies probably derives from captive birds that have molted or died and from old flies and old feather collections acquired before passage of restrictive laws. Professional tyers are almost unanimous in their denial that illegal traffic exists. Typical responses to my questions included the following: "There's not a tyer anywhere who can afford to go down to South America and shoot this stuff." "Black market? There isn't one. There's enough stuff right here." "Man, that's drug country. No one would dare. They see you running around the puckerbrush with a shotgun, and you're dead meat."

But the tyers don't understand how black markets work. Customers don't run black markets; they fuel them. And while tropical birds may not yet have been seriously depleted by the salmon-fly fad, they surely will be if the bottom doesn't fall out of the feather market. Consider, for example,

WOLFGANG KAEHLER

Bird species such as the blue-and-yellow macaw, at right, and the cock-of-the-rock, below, already face serious threats to their survival. Salmon fly enthusiasts should be aware that if they collect flies made with original materials they are fueling a market for rare bird feathers. Far right, author Ted Williams holds a salmon, caught with a Black Bug—an ugly but harmless salmon fly tied with deer hair.

GREG VAUGHN

feather merchant Sol Shamilzadeh of New York City who offers a pair of "florican" bustard feathers for $150. ("The best pairs I've had in a long time.") Small clusters of breast feathers from the scarlet macaw and blue-and-yellow macaw he sells for $32.50 each. To some tyers "florican" means the endangered great bustard, but Shamilzadeh assures me that his feathers come from the smaller, unprotected, and relatively abundant "Bengal florican" (*Eupodotis bengalensis*). Paul Schmookler of The Complete Sportsman in Millis, Massachusetts, offers blue chatterer feathers for $700 per hundred, Indian crow (fruitcrow) for $500 per hundred.

"Commercializing an exotic species that is threatened in its country of origin by developing a market for feathers that are not called for in the traditional patterns is irresponsible, senseless, immoral, and cowardly," avers Kevin Schneider of Lakeside, California. But Schneider apparently doesn't have a problem with commercializing depleted exotic species that *are* called for in the traditional patterns. His "Feather Way" mail order business keeps tyers stocked with feathers from such birds as the scarlet macaw—a species unlisted in the United States but on CITES Appendix I—at $85 per pair and feathers of "speckled bustard" (a generic name for perhaps a dozen species which, generally, are in major trouble) for $275 *each.* Schneider says his feathers are picked up as molts from birds already in this country and plucked from "birds that have died in captivity." He maintains that he gluts the market, thereby preventing exploitation of wild birds. And no, he doesn't think that his business props up the pet trade and perhaps encourages premature deaths.

The lack of any paper trail makes it impossible to measure the size of the black market in exotic feathers for salmon flies. I was, however, able to turn up indisputable evidence that a healthy one exists. Zoologist Roxie Laybourne is an internationally known feather expert with the USFWS who identifies feathers suspected of illegally coming into the country. At one time or another she's seen just about all the traditional materials, including blue chatterer, grey junglefowl, cock-of-the rock, scarlet ibis, and great bustard. There never seems to be a lot of it, she says, but sometimes several of these species are in the same shipment. Declares Laybourne's USFWS colleague, special agent Chris Dowd: "We find stuff that was falsely invoiced under something like magazines, and it will end up being feathers."

Two other special agents, working undercover, are building a case against illegal traffickers. One of them told me this: "There are numerous, obvious violations of the Migratory Bird Treaty Act, the Endangered Species Act, the Marine Mammals Act, and the Lacey Act. Those flies, done with the proper materials, are a who's who of endangered species and migratory birds . . . . We found several shops and had leads on others that were talking about their sources of macaw and speckled bustard and junglefowl and blue heron and on and on and on—all of which sounded illegal in context. We had an individual who was smuggling in large volumes of polar bear hair and bragging about how he could get all these junglefowl capes in from Canada, another individual who said he could get blue herons, another who was interested in waterfowl with spring plumage [waterfowl feathers may be bought and sold for fly tying but only if birds are legally taken during hunting seasons—always in fall or winter, never spring]. In one shop we purchased a golden plover right off the wall. A guy even said he could get eagle feathers . . . ."

One well-known tyer who asked not to be named had this to say: "You go to any antique show or sportsmen's show, it's like a nightclub in the right part of town. You whisper and you can get the stuff, just like you can get cocaine. Chatterer, Indian crow, toucan, macaw . . . . There's lots of muffled talk, deals going down all the time."

"If pet shops are allowed to sell their birds, goddamit we should be able to sell our feathers," pronounces Complete Sportsman owner Paul Schmookler. "Everybody is in violation. You're a fly tyer; I bet I could go through your stuff and pick out 10 violations right now. [I bet he couldn't.] There are 30 sport shops in the United States that I could walk into with agents and close down."

Feeling badly about the "monster" his book created, Poul Jorgensen is leading the crusade for substitute feathers from common, often domestic species. Because of his name he gets as much as $350 for a salmon fly but reckons he could get $800 if he followed the original recipes—something he refuses to do. When the feather merchants phone him he gives them hell, tells them they have "a lot of nerve." "I'm very aware of this demand for original materials," he says, "and I'm trying to remedy it because it wasn't really meant to be . . . . I'm offering an alternative in the form of these stack-wing flies [tied with chicken feathers.] These guys tell me they get feathers from zoos and private owners. *I know for a fact that some of the guys get them from South America.* You can never tell if these birds are hunted illegally. Shooting an Indian crow or blue chatterer is like shooting an oriole. They're songbirds."

Another concerned tyer, Ron Alcott of Groton, Massachusetts, finds it especially ironic that the substitution of prescribed feathers is itself a tradition of Victorian salmon-fly tying. Blue chatterer, he explains, came into wide use when the superior feathers of the Eurasian kingfisher (now readily available) could not be obtained. For a cover shot, *American Angler and Fly Tyer* commissioned him to tie two Jock Scotts, one with original materials, one with substitutes. The exercise proved that virtually none of the puffy purists and self-proclaimed experts can tell what an "authentic" feather really is. Alcott rails against what he calls "slavish devotion to original feathers" and "mindless repetition of old recipes."

Since no fisherman can tell only half a fish story, especially when he is the hero, I'll now reveal that I finally caught that salmon at Sutter's Pool, but not on Bill Hooper's Green Machine. I caught it on Bill Hooper's Black Bug—another plug of deer hair which, if possible, is even uglier than the Green Machine. Since I released the fish, we safely entered its weight in the log at 22 pounds.

We fly-tying anglers just love to release our fish, especially when we have an audience. We love to hold played-out salmon in the current, cradling them in our oh-so-sensitive hands. And before returning them to their element we pat them lovingly on the flank, or, in extreme cases, kiss them on the forehead.

BILL HOOPER

We fly-tying anglers are much too pompous to think of ourselves as hypocritical. When the Northern Hemisphere slouches from the sun and the Great Bear dips earthward to walk through the naked tops of river alders, we sit by the fire, sipping fine sherry, reading *The Atlantic Salmon Journal*, waxing dewy-eyed about the gallant homeward journey of the King of Fish. We attend expensive fund-raising dinners, the better to fight driftnetters, clearcutters, pesticide sprayers, dam builders, water polluters, poachers, black-market entrepreneurs . . . . We have no patience with any special-interest group that would further deplete our fragile, beautiful resources. ■

Ted Williams is an angler, fly tyer, and environmental journalist who has loathed baseball since childhood.

TIM GALLAGHER (4)

BINOCULAR QUEST

by Todd A. Culver and Heather Gerhart

Ready for a new pair of binos? Lab staffers selected the best for you.

Birders love to argue about binoculars. The five veteran birders who make up the Lab's resident big day team, the Sapsuckers—Tim Gallagher, Kevin McGowan, Ken Rosenberg, Ned Brinkley, and Todd Culver—are no exception; they all have strong (and sometimes conflicting) opinions about which binoculars are best for bird watching. Last May when we headed down to New Jersey for the World Series of Birding (a grueling 24-hour birding competition covering the entire state) our borrowed Ford Explorer was packed full of birding experience, along with more than $10,000 worth of optical equipment being field tested for this article. What we learned about the latest binoculars should be helpful to you when you go shopping for your next pair.

The first two questions to ask yourself at the start of a quest for new optics are: 1) How much can I afford to spend? and 2) What magnification power is best for my needs—7x, 8x, or 10x? The Sapsuckers all agreed on the first point: spend as much money as you can afford. A thousand dollars or more may seem like an obscenely large amount of money to spend on binoculars, but when you divide that figure by the number of years you'll be using the binoculars, and then consider how much top quality optics will enhance your day-to-day birding enjoyment, you may decide the investment is worthwhile.

But ask a birder which magnification power is best and you'll likely get an earful. Ken, Ned, and Tim all prefer 10x, which provides an image magnified 10 times greater than what you would see with your naked eye. When the birds are far away—hawk watching, shorebirding—10x binoculars are required equipment. However, for spotting close-up warblers flitting through dense foliage, many birders prefer 7x binoculars, which usually provide a brighter image and wider field of view than 10x. Also hand vibration is less noticeable with 7x. Kevin and I both carry 7x binoculars. We had over a week during pre-big day scouting to settle the dispute over which magnification power is best, but at the end we all still swore by our original choices. So on the question of which magnification power is best, you'll have to decide for yourself.

May 16, 1992—The World Series of Birding

New Jersey's Kearny Marsh is an exciting place at midnight. Half the excitement for us comes from starting the big day. The other half comes from seeing the gang of young hoodlums-in-training hanging out under the nearby railroad bridge. (I doubt that they're looking for marsh birds.) A mallard and then a Virginia rail sound off nervously. Ken and Ned bellow bird calls into the marsh, trying to get a coot to answer. No luck. Our maniacal bird calls seem to keep the "locals" under the bridge at bay. Kevin and I quickly scan the water's edge. Both of us carry Zeiss 7x42s, binoculars that gather more light than your eyes. I've owned mine for over a year now and I still gasp at how bright the image is. As I look across this urban marsh with my binoculars at midnight, there's enough light to see logs, reeds, pop bottles, rats, and other Kearny Marsh specialties. But I can't find any birds. Suddenly a nighthawk booms overhead. "Got it!" we scream together, then run back to our Explorer to continue our adventure.

An hour after the sun was supposed to rise, we're looking for warblers and a hermit thrush in the pouring rain. "Redstart singing behind," whispers Ken. "Got it!" "Cerulean in the top of the maple next to the spruce." "Got it!" "Solitary vireo over the road." "Got it!" We spot several more species and check them off the list in less than five minutes. Our bright, easy-to-handle 7x42 binoculars have been great for picking out birds in these dimly lit woods.

Twenty minutes after we pull into Brigantine National Wildlife Refuge, a dense fog rolls in from the ocean. This time I grab the Leica 10x40s; Kevin also puts away his 7x42s and straps on the Bausch & Lomb Elite 10x40s. Scanning flocks of peeps through the fog, we try to pick out white-rumped and western sandpipers from the hoards of semipalmated and leasts. In shorebirding, the differences between species are subtle. "You've got to have 10x binoculars," says Ken. "A 7x may be bright, but what good is it if you can't see the field marks? And besides, the best 10x binoculars are still *really* bright, so you don't give up much to get the extra magnification." For hawk watching, or birding on the coast, or in the tropics, I think he's right to choose 10x binoculars. But I still won't give up my 7x42s for finding warblers.

The Criteria

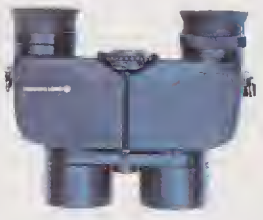
Before we left for New Jersey to compete in the World Series, we got together with the Crow's Nest Birding Shop staff and did some extensive testing under controlled conditions. A battery of indoor and outdoor tests revealed which binoculars were best suited for birding. We began by compiling useful information about each model. The table lists some basic statistics: prism design (roof, Porro, or reverse Porro), with or without armor-coating, extent of warranty, and more.

Prism Design

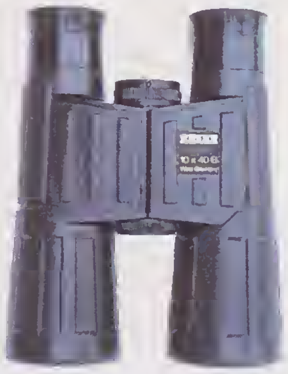
Modern binoculars come in three basic designs: Porro prism, reverse Porro prism, and roof prism. Porro prisms have been around the longest. You can recognize them easily because their ocular (eyepiece) lenses are much closer together than their objective (front) lenses. These are the standard "workhorse" binoculars you see everywhere. The better Porro prism binoculars are rugged, dependable, and less expensive than comparable roof prism binoculars. On the down side, however, standard Porro prism binoculars tend to be heavier, bulkier, and less water-resistant.

With reverse Porro prism binoculars, the manufacturers have inverted the standard design, placing the objective lenses closer together than the eyepieces. This design is used in a number of compact binoculars.

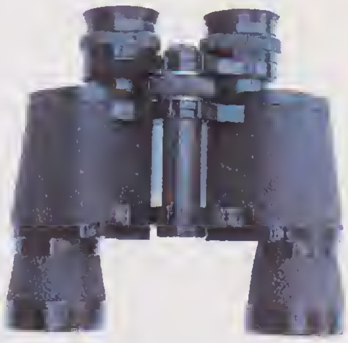
Roof prism binoculars have eyepieces directly in line with their objective lenses. They weigh significantly less and are more compact than comparable Porro prism binoculars, and they can be sealed more effectively against moisture. And most people find roof prism binoculars more comfortable to hold. But they tend to be expensive.



Reverse Porro Prism



Roof Prism



Porro Prism

Interpupil Distance

Take a close look at any group of birders. You'll notice that some have close-set eyes, while others have eyes that are widely spaced. Binoculars are

Price range	Model	Suggested List Price	Prism	Armor?	Warranty	Interpupil Distance	Good for Eyeglasses?	Weight (ounces)	Play of Focus	Focus Feel	Brightness	Optical Performance	Min. Focus Distance	Field of View (at 230')	Fog
over $800	* Bausch & Lomb Elite 10x42	$1,956	Roof	Yes	Limited Lifetime	2 3⁄16" - 2 7⁄8"	2	28.1	400°	1	2	1	11'	23.8'	No
	* Bausch & Lomb Elite 8x42	$1,900	Roof	Yes	Limited Lifetime	2 3⁄16" - 2 7⁄8"	1	29.1	400°	1	1	1	10.5'	27.5'	No
	* Bausch & Lomb Elite 7x36	$1,704	Roof	Yes	Limited Lifetime	2 3⁄16" - 2 7⁄8"	1	25.4	400°	1	1	1	5'	30'	No
	* Leica Ultra 10x42 BA	$1,590	Roof	Yes	Lifetime	2 3⁄16" - 2 7⁄8"	2	32	330°	1	2	1	14'	20'	No
	* Leica Ultra 8x42 BA	$1,590	Roof	Yes	Lifetime	2 3⁄16" - 2 7⁄8"	2	32	330°	1	1	1	12'	20'	No
	Nikon Classic Eagle 8x40 DFC	$1,232	Roof	No	25-year Limited	2 1⁄8" - 2 13⁄16"	2	28.2	190°	1	3	2	14.5'	27.5'	No
	* Zeiss Dialyt 10x40 B/GAT	$1,250	Roof	Yes	Lifetime	2 3⁄16" - 3"	2	26.4	330°	2	3	1	15'	20'	No
	* Zeiss Dialyt 7x42 B/GAT	$1,215	Roof	Yes	Lifetime	2 1⁄4" - 2 15⁄16"	1	28.2	450°	1	1	1	9.5'	30'	No
$500-$800	aus Jena Luxus 10x40	$ 775	Roof	No	Limited Lifetime	2 3⁄16" - 2 7⁄8"	3	24.6	270°	1	3	2	18'	20'	No
	Bausch & Lomb Custom 10x40	$ 528	Porro	Yes	Limited Lifetime	2 1⁄4" - 2 13⁄16"	2	30.9	460°	1	3	2	12'	20'	Yes
	Nikon Execulite 9x30	$ 567	Roof	No	25-year Limited	2 3⁄16" - 2 7⁄8"	4	16.7	630°	1	5	2	11'	22.5'	Yes
	* Nikon E CF HP 8x30	$ 512	Porro	No	25-year Limited	1 7⁄8" - 2 7⁄8"	2	20	330°	1	2	1	11'	32.5'	Yes
	* Optolyth Touring 10x40	$ 608	Roof	Yes	Limited Lifetime	2 1⁄8" - 3"	2	24	410°	2	3	1	16'	27.5'	Yes
	Swift Audubon 7x35	$ 600	Roof	Yes	Lifetime	2 1⁄4" - 3 1⁄16"	2	21	460°	2	2	2	10'	20'	No
$200-$500	Celestron Ultima 10x42	$ 350	Porro	No	Limited Lifetime	2" - 2 7⁄8"	2	19.7	360°	1	2	2	15'	23.8'	Yes
	Celestron Ultima 8x32	$ 330	Porro	No	Limited Lifetime	2" - 3"	2	17.4	370°	2	4	3	12'	30'	Yes
	Minolta Weathermatic 7x42	$ 406	Roof	Yes	25-year Limited	2 1⁄4" - 2 7⁄8"	1	29.1	270°	1	3	3	12'	25'	No
	Optolyth Alpin 10x40	$ 360	Porro	Yes	Limited Lifetime	2" - 2 3⁄4"	4	18.2	690°	1	3	3	14'	25'	Yes
	Optolyth Alpin 7x42	$ 360	Porro	Yes	Limited Lifetime	2" - 2 3⁄4"	2	18.1	690°	1	5	3	27'	25'	No
	Optolyth Alpin 8x30	$ 298	Porro	No	Limited Lifetime	2" - 2 3⁄4"	4	14.9	690°	1	5	3	13'	32.5'	Yes
	Pentax DCF 8x42	$ 375	Roof	No	Original Owner	2 1⁄4" - 2 7⁄8"	2	31	360°	1	5	3	24'	27.5'	No
	Pentax PCF 7x50	$ 220	Porro	No	Original Owner	2 3⁄16" - 2 3⁄4"	2	31.8	590°	2	1	3	15'	22.5'	Yes
	Pentax PCF 7x35	$ 200	Porro	No	Original Owner	2 3⁄16" - 2 3⁄4"	3	24.3	560°	2	3	4	7'	25'	Yes
	Redfield WP 10x50	$ 407	Roof	Yes	Limited Lifetime	2 3⁄8" - 3 1⁄16"	3	28.6	170°	2	4	3	24.5'	22.5'	No
	Redfield WP 7x35	$ 361	Roof	Yes	Limited Lifetime	2 5⁄16" - 3 1⁄16"	2	20.5	170°	2	4	3	10.5'	25'	No
	Swift Audubon 8.5x44	$ 399	Porro	No	Lifetime	2 1⁄8" - 2 3⁄4"	2	28.9	460°	1	3	2	10.5'	31.25'	Yes
	* Swift Ultra Lite 8x42 ZWCF	$ 345	Porro	Yes	Lifetime	2" - 2 15⁄16"	2	21	370°	1	2	2	16'	20'	No
	Swift Egret 10x42 HCF	$ 288	Roof	Yes	Lifetime	2 1⁄4" - 2 13⁄16"	4	18.3	320°	1	5	3	14'	25'	No
under $200	* Bushnell Birder 7x35	$ 75	Porro	No	Limited Lifetime	2 3⁄16" - 2 7⁄8 "	3	18.8	460°	2	2	3	13'	22.5'	Yes
	Minolta Standard 7x35	$ 141	Porro	Yes	25-year Limited	2 3⁄16" - 2 13⁄16"	3	26.8	270°	2	3	3	12.5'	32'	Yes
Compacts	* Bausch & Lomb Custom Compact 7x26	$ 457	Rev. Porro	No	Limited Lifetime	2 1⁄4" - 3 1⁄8"	2	11.5	370°	1	1	2	6'	27.5'	Yes
	Leica 10x25 BCA	$ 645	Roof	Yes	Limited Lifetime	1 1⁄4"† - 3 1⁄4"	4	8.8	740°	3	4	3	16'	20'	No
	Leica 8x20 BCA	$ 615	Roof	Yes	Limited Lifetime	1 1⁄4"† - 3 1⁄4"	4	8.1	740°	3	4	4	8'	26.3'	No
	Minolta Pocket 7x21	$ 137	Rev. Porro	No	25-year Limited	1 3⁄8"† - 2 3⁄4"	4	9.7	350°	2	4	5	6'	26.3'	No
	Minolta Compact 8x23	$ 132	Rev. Porro	No	25-year Limited	2 1⁄4" - 2 7⁄8"	4	8.8	340°	2	3	5	21'	25'	Yes
	Nikon Travelite III 9x25	$ 156	Rev. Porro	No	25-year Limited	2 1⁄8" - 2 7⁄8"	4	9.4	350°	2	2	3	12'	20'	Yes
	Pentax UCF 8x24	$ 160	Rev. Porro	No	Limited Lifetime	2 3⁄16" - 2 15⁄16"	4	9.9	590°	3	2	5	8.5'	25'	No
	Redfield 8x24	$ 210	Roof	No	Limited Lifetime	1 3⁄8"† - 3 1⁄16"	4	9.6	270°	2	4	5	14.5'	28.5'	No
	Swift Micron 8x25 CF	$ 120	Rev. Porro	No	Limited Lifetime	2 1⁄4" - 2 13⁄16"	4	10.1	740°	2	3	4	6'	20'	Yes
	Zeiss Design Selection 8x20 BT	$ 530	Roof	No	25-year parts/5-year labor	1 1⁄4"† - 2 7⁄8"	4	6.4	350°	2	3	4	8'	25'	Yes

Rating system: 1 through 5, 1 is best. *Top rated † = when folded

BHL

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TIM GALLAGHER (2)

Todd Culver, optics tester extraordinaire and coauthor of this article, douses several thousand dollars worth of binoculars prior to baking them in the sun and chilling them in a refrigerator.

hinged, allowing birders to adjust them to match the distance between their eyes. Unfortunately, some binoculars may not adjust far enough to fit you correctly. And a good fit is just as important when buying binoculars as it is when buying eyeglasses. Using a clear plastic ruler, we measured the minimum and maximum distances between each binocular's eyepieces. (You can also use a clear plastic ruler to measure the interpupil distance of your eyes).

Weight

Next we weighed each binocular (without its strap) on the Lab's postal scale. Something that hangs around your neck all day should be as lightweight as possible (although the neoprene straps now available on the market can make heavy binoculars easier to carry).

Focusing

We measured the amount of rotation needed to change the binocular's focus wheel from closest focus to infinity. The numbers in the table are degrees of rotation (360° is a full circle). Binoculars with low numbers are the fastest to focus. The smoothness of the focus mechanisms was also rated. Low quality binoculars feel like there's grit in the mechanism.

Brightness

The relative brightness between binoculars is generally determined by comparing exit pupil sizes. To figure out exit pupil size, you simply divide the power of the given binoculars into the size of the objective lens. In 7x35 binoculars, for example, the 7x represents the power, and the 35 represents the diameter of the objective lens in millimeters. According to this formula, 7x35 binoculars have an exit pupil of 5 millimeters, while 10x40 binoculars have an exit pupil of 4 millimeters. Does that mean that 7x35 binoculars should be brighter in low light conditions than 10x40 binoculars? In theory, yes. But an inexpensive pair of 7x35 binoculars might lose so much light to poor optics and inadequately coated lenses that the exit pupil figures become meaningless. We decided to try a more direct method for comparing relative brightness. Using the dimmer switch in the Lab's auditorium, we created an artificial sunset. To simulate trying to spot a bird's wing bars or eye-rings, we taped a page of laser-printed text to one wall and sat in the dimly lit room, trying to read the page. Eye fatigue forced us to do this test twice, but we finally reached agreement on which binoculars were brightest and which were unacceptably dim.

Optical Performance

Optical performance—a measure of how sharp an image appears in binoculars—is critical for watching birds. We dug out the eye chart we used in the last binocular review ("Scanning for Optics," Autumn 1988). After bribing some Lab staffers (Tim Dillon, Cynthia Berger, Tim Gallagher, Melanie Jordan, and Diane Tessaglia) with free pizza, we hauled them and over 50 binoculars to the Cornell University football field. We set up the eye chart in the end zone and recorded the smallest line of letters we could read clearly from the midfield line.

Minimum Focusing Distance

We laid a 25-foot measuring tape on the artificial turf in front of the eye chart. Inching closer and closer to the chart, we measured each binocular's minimum focusing distance. Just as we were finishing up, an eager group of soccer players swarmed onto the field. Only a lightning retreat prevented thousands of dollars worth of optical equipment (and several Lab staffers) from being trampled.

Field of View

As the soccer game started, we stood on the sideline and counted the number of vertical posts in the handrail along the stands. The posts were exactly 5 feet apart, allowing us to calculate the field of view at 230 feet. The numbers in the table allow binoculars to be compared but are not the same as the field of view that may be stamped on some models. This value is usually measured at 1,000 feet. We packed up and hauled the binoculars back to the parking lot, only to find that our car had been ticketed by campus security.

Water Resistance

It's easy to forget about water resistance until you get caught in a summer thunderstorm or fall through a frozen pond in winter (as one Lab staffer did during a Christmas Bird Count). One sunny afternoon I carefully laid the binoculars out on some large slabs of limestone in the Lab's bird feeding garden and hosed them down several times. After baking in the sun, the binoculars were stacked in a refrigerator for a couple of hours, forcing any moisture that had leaked inside to condense on the lenses. The test quickly pointed out which binoculars were adequately sealed.

The Results

At the top of the heap are Bausch & Lomb Elites, Leica BA Ultras, and Zeiss 7x42s and 10x40s. You can't go wrong with any of these binoculars. Choosing among them is a matter of personal preference. Eyeglass wearers, however, did not get along with Leica's high-tech retractable eyecups. They don't allow birders with thick eyeglasses to get a full field of view. As we found in our 1988 review, the Zeiss 7x42s are still the brightest binoculars. But four years ago they were head and shoulders above the rest. Now the Leica 8x42 and the Bausch & Lomb Elite 8x42 and 7x36 binoculars are nipping at their heels. In the field, the differences among these glasses are virtually undetectable.

We picked our favorite binoculars in four price ranges. The new Bausch & Lomb Elite 7x36s are a lot of binocular in a small package. Bright and tack sharp, they weigh only 25.4 ounces and focus down to 5 feet. These binoculars *are* expensive, but you're getting sealed optics and a lifetime "no questions asked" warranty. If they break, they are fixed or replaced. They are truly the last binoculars you'll ever have to buy.

But you don't need to spend $1,000 to get a first-rate image. Check out Nikon's new E series 8x30 and Optolyth's Touring models. Both were given a #1 rating in optical quality and produce an excellent image for watching birds. The Nikon E weighs only 20 ounces; it's a pleasure to carry and handles beautifully. Optolyth's Touring 10x40 compares favorably with binoculars costing twice as much. But I wish they had sent us their Touring 7x42 to review; it's probably brighter than their 10x40. The biggest drawback with both binoculars is that they couldn't stand up to our fogging test. However, at half the price of the top-rated models, they are worth checking out if you're on a budget.

At a suggested retail price of $345, Swift's new Ultra Lite 8x42 is the best binocular for the buck. Birds look bright and crisp through the Ultra Lites. Their 21-ounce weight and armored coating make them the most comfortable Porro prism we examined. Amazingly, they were the only Porro prism binoculars to pass the fogging test. I wish I'd had a pair of these when I first started birding.

The Bushnell Birders continue to amaze us. Priced at only $75, they outperform many more expensive binoculars. Their greatest strength is the brightness of the image they provide. But handle your Birders with care; one hard jolt and they may be knocked out of alignment. Bushnell Birders are perfect for beginners (or kids) who want to try bird watching but aren't sure they'll get addicted, or for those who crave a pair of first-rate optics but need to save their pennies. After the review, I was so impressed with them that I bought a pair to carry around in my car.

And the winners are . . . (clockwise from top left) the Leica BA Ultra, Bausch & Lomb Elite, and Zeiss 7x42 and 10x40 B/GATs. Any of these fine binoculars should provide years of excellent service.

Finally, if you're looking for a pair of compacts, the Bausch & Lomb Custom Compacts are the only choice. They're amazing, offering a full-size image in a compact package that will fit nicely in your shirt pocket. The other compacts are difficult, if not impossible, to use for birding.

Binoculars are a birder's most important tool. We hope our review will help you to pick a new piece of glass. But remember: this review should serve only as a guide in selecting your new binoculars. Where you bird and personal preference will determine which binoculars are best for you. Always test binoculars before you buy them. How? Local bird club field trips can provide a smorgasbord of optical equipment. Dress neatly, comb your hair, and people will most likely give you a look through even the most expensive optics. And talk to people. Birders love to talk about their binoculars.

Good birding! ■

Todd Culver is education specialist at the Lab. Heather Gerhart is manager of the Crow's Nest Birding Shop.

La Caccia: An Italian Tragedy

by Ann Taylor

In their passion for the hunt, Italian shooters and trappers may be killing the music in their countryside

It doesn't take long to learn that being a bird watcher in Italy or writing about being a bird watcher in Italy also requires some attention to the Italian passion for hunting. The two subjects are, unfortunately, inseparable. The *caccia* is a nagging preoccupation among bird watchers, one that cannot be ignored in favor of escape to blissful bowers where feathered friends reside in sylvan comfort. The ancient attractions of the hunt are complex, the current effects on the birds incalculable.

"Where the Italians live, the birds don't," is an all-too-common assessment, especially by those living to the north of Italy and regretting the loss of so many migrants over Italian air space. English traveler John Haycroft once commented, "Italians are such passionate hunters that they—of all people—have killed music in their countryside." And one Italian bird watcher muses, "The smart birds avoid Italy altogether. The others learn to stay very, very quiet."

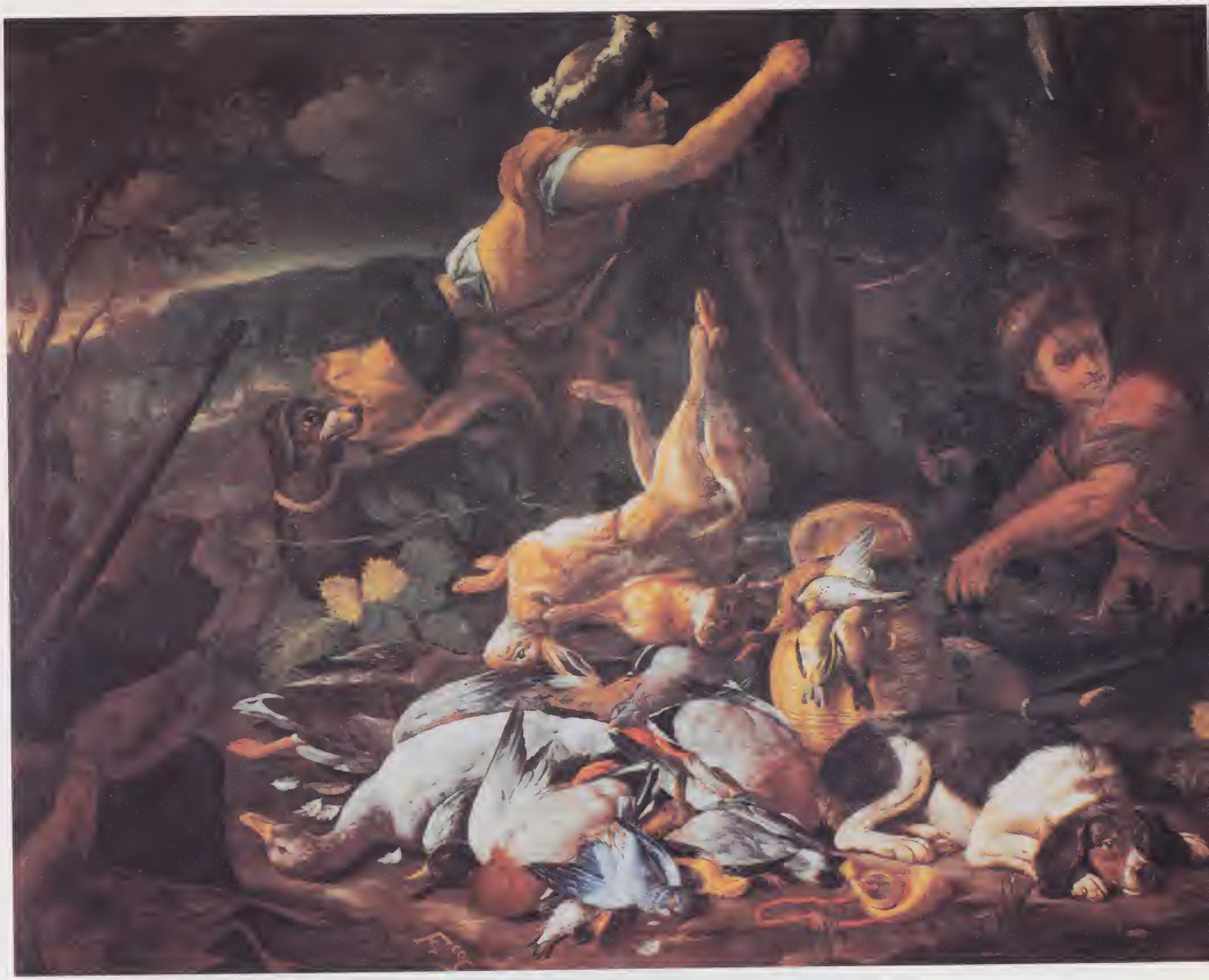
This is not to say that all Italian hunters are irresponsible exploiters of the natural world or that none show concern for the welfare of birds. I do suggest that the *extent* of interest in the hunt and the too frequent resistance to legal restrictions make the situation in Italy especially difficult for the birds. Tuscany, where I lived for nearly a year, has the largest concentration of hunters in the country. In a land universally well-stocked with lovers of the *caccia,* Tuscany fields around 15 percent of the total.

I lived with my husband and two young children in a mountain villa above Florence, near picturesque woods. We were awakened each dawn by a salvo unwelcome to us: the early morning hunt. Shotgun shells littered the evergreen trail through the woods near our house, more with each passing week of the long September-to-February hunting season, and we all became uneasy walking there. From my front balcony one October evening, I focused my binoculars across a sunny slope, trying to bring in a distant and very busy bird. What I got instead was a hunter with his dog and his shotgun stalking the tall cypress where my bird had perched. I found myself rooting for the birds, so pursued were they.

Throughout the season, butcher shops announce fresh *passerotti* (an ironically affectionate term for sparrows) and small birds for *spiedini,* that is, ready for the spit. Rural restaurant menus feature birds of the *caccia* and a toy shop displays a game in the show window—a tall frame with whirling plastic pigeons for targets and a child-sized popgun for bringing them down. A television quiz show has as one of its categories the local hunting season opening and closing dates for various types of birds—"Blackbird! September 21 to December 31! Jackdaw! September 21 to February 28!" the contestant recites without a pause. For many Italians, bird hunting is a much-loved part of daily life, a patrimonial gift. For many Italian bird watchers, this devotion is a daily sorrow, an outdated insensitivity to the facts of the modern world.

Birders attempt to stir sympathy. Photographs in birding magazines show grim pictures of tiny birds strangled in a maze of netting, of wild birds peering out the tiny holes of shipping crates, of large hunting parties setting out for a recreational shoot. One particularly disturbing photograph depicts a shot kestrel with wings stretched wide hanging gruesomely from a rugged cross.

In a telling report, the prominent Italian bird watcher Francesco Mezzatesta describes the fate of a migrating shrike that landed exhausted on



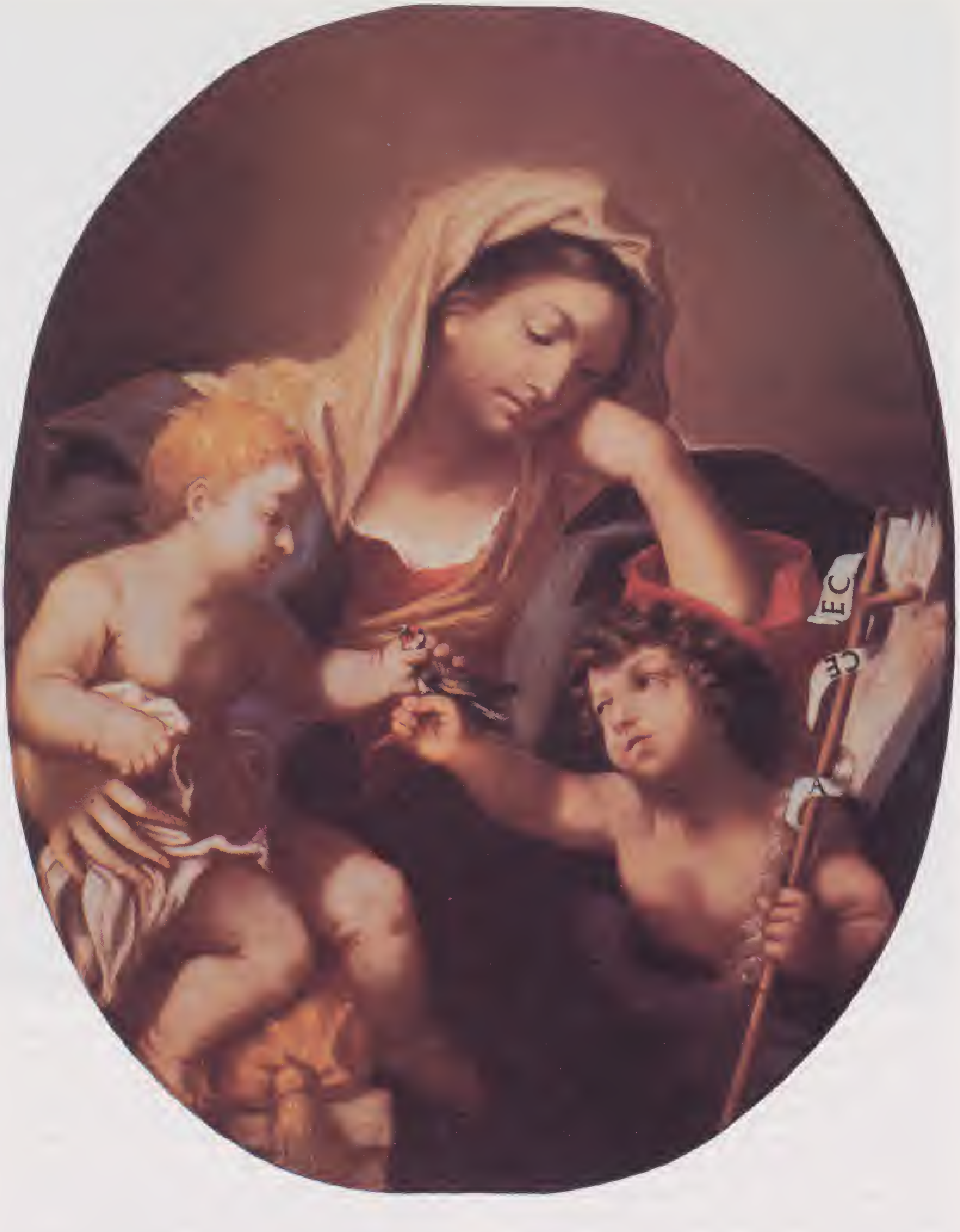
the deck of a ferry returning him and a group of bird watchers from the Island of Capraia to Tuscany. Having almost completed its long flight from the Sahara and over the Mediterranean, the tired shrike chanced a free ride, possibly saving its own life, Mezzatesta explains. But then, with disbelief, the group watched two sailors force the bird off the deck and back to sea. And with more than disbelief, they endured the cheers of approval from some young Tuscan hunters who also happened to be on board. The hunters then turned to mocking the birders. Most of the other passengers simply looked on. From this, Mezzatesta draws lessons not only about the cruel force of ignorance, but also about the passive silence of too many observers reluctant to oppose the vociferous minority of hunters.

It is true that in June 1990, after years of failed efforts, a national referendum regulating some hunting activities was finally passed, but the political power of hunters remains strong. It is unlikely that further limiting referenda will be attempted for many years. As one supporter of the hunt explained, "You protectionists have more success in stirring public opinion . . . but we hunters are stronger in parliament."

And so the struggle goes on, a long list of confrontations and losses, mostly suffered by the birds. Resistance to the excesses of hunting remains active, however, and seems to be gaining wider support.

Although not yet among the most solvent in Italy, groups with memberships in the tens of thousands and concerned in varying degrees with the welfare of the natural world survive and sometimes thrive there. Some are part of larger, world organizations (The World Wildlife Fund), some devoted to specific purposes (LAC—The Alliance for the Abolition of Hunting), some including nature among other concerns (Italia Nostra—

Titled Trofeo di caccia (Hunting Trophy), *this 17th-century painting by Francisco Questa graphically depicts the wide range of bird species considered fair game in Italy over the centuries. Even now, songbirds are shot and trapped in the country.*



devoted to the "historic, artistic, and natural patrimony"), some aimed primarily at political action (Lega Ambiente—Alliance for the Environment), and some more broadly philosophical in their approach (Amici della Terra—Friends of the Earth).

Much to the dismay of hunters, on the first day of hunting season, demonstrators from a variety of groups march across the countryside, blowing whistles, tooting horns, and ringing cattle bells. At other times, resisters gather shotgun shells to make huge symbolic heaps of refuse, or they sponsor conferences on water pollution and "Bioregional Fiestas" in support of the environment. Seasonal bird watching camps encourage observation and protection of certain endangered species (for the honey buzzard, for example, a raptor annually killed in Sicily and Regio Calabria as a talisman to assure wives' fidelity).

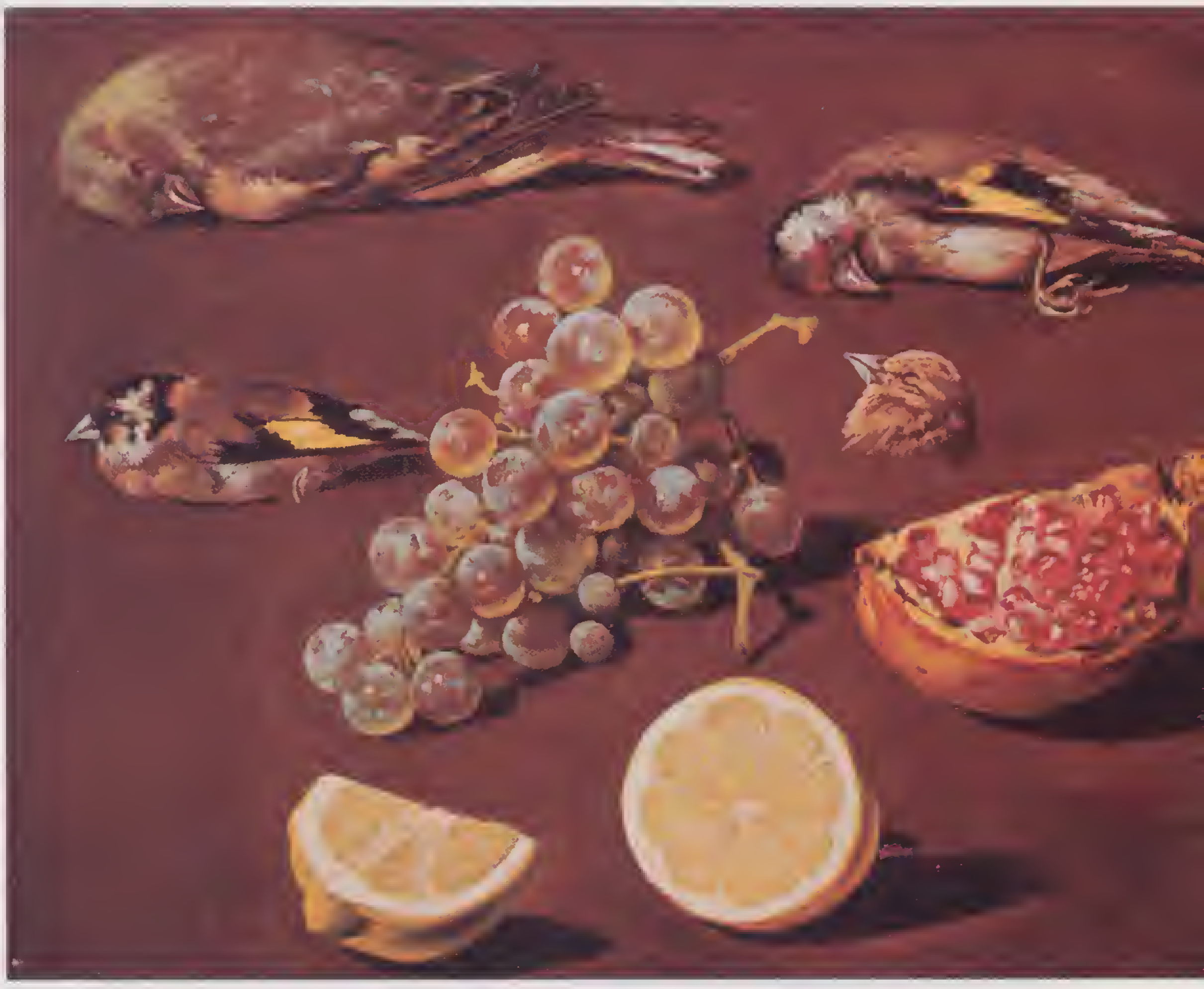
For permanent sanctuary, eight national parks already exist, and others are proposed, while nature parks, nature reserves, wildlife refuges, protective oases, and state forests offer further chances for the birds' survival. Local magazines and newsletters focus on regional concerns, and national glossies like *Natura, Oasis,* and *Airone* attract a wide readership. A new journal, *Ali,* is devoted entirely to the protection of Italian natural resources.

Also attracting wide interest was the court case of the popular actor and singer Adriano Celentano who, in a now notorious television monologue in 1987, vigorously criticized the Italian devotion to hunting: "There are about two million hunters in Italy who annually conduct a massacre, killing two billion birds." Part of his attack was to advise his cheering audience and his many viewers to write in a sentence on the bottom of an imminent referendum ballot—"Hunting is against love." For publicly recommending defacement of ballots, thereby making them invalid, this celebrity was threatened with a two-year jail sentence. Holding fast to his views about the *caccia,* Celentano argued that he was at the time unaware of the law forbidding such write-in messages, and the judge finally exonerated him from all charges. Critics saw nothing but folly in his protest; supporters claimed a symbolic victory for the birds.

In short, many Italians, including some hunters, see far more in the natural world than a potential gun blind. The one organization devoted almost exclusively to the birds and their well-being is LIPU (Lega Italiana Protezione Uccelli—Italian Alliance for the Protection of Birds). Founded in 1965, its now 30,000 and steadily-growing membership in Italy and abroad supports the creation of natural oases, the establishment of educational centers and programs, the care of injured birds, the revision of hunting laws, and the protection of endangered species. LIPU also supports scientific research, international cooperation with other organizations with similar interests, and the publication of *Ali-Notizie* for adults and *Ali-Giovani* for school-age readers.

It is LIPU that sponsors the so-called "Guardia Venatoria," or "Hunting Guard," a group of volunteers with government permits to monitor hunters' compliance with the law. In all of Italy, approximately 100 guards are active. In the field, they issue citations to violators and later may make a case before a judge whose fines might be as little as $8.00 or as much as $1,800.00 plus loss of license. In all of Italy, the Guardia issues approximately 500-600 citations per year, not a true reflection of the number of violations, but still a discouragement to the gun-happy and indiscriminate.

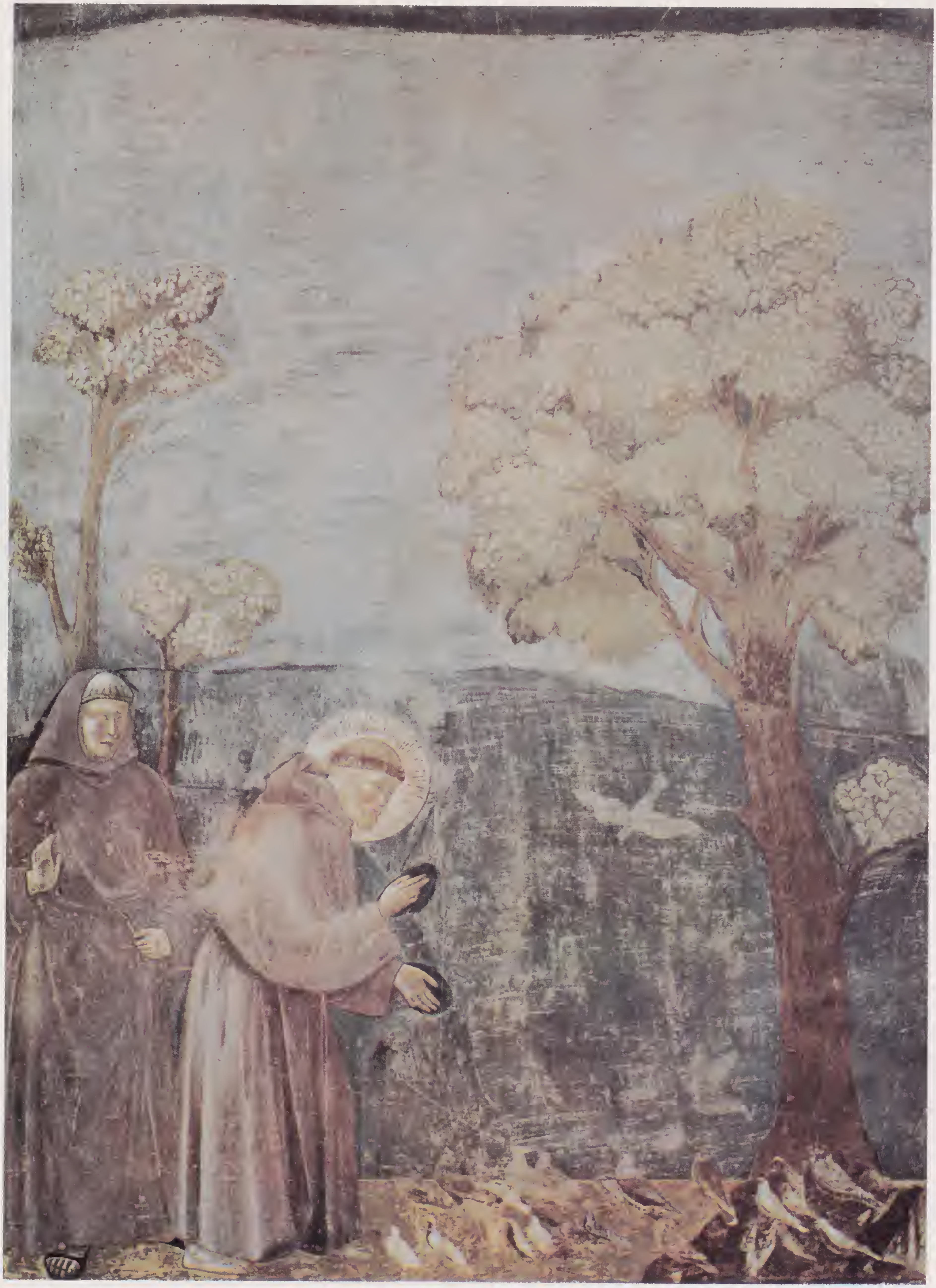
Another, more local, discouragement to the violators of hunting regulations is the recent resistance to the Fiera degli Uccelli (Festival of the Birds), held annually at Florence's old Porta Romana. Long an occasion for hunters to gather information and supplies—cages, traps, bullets, guns, nets, live birds for decoys—aspects of the Fiera were declared illegal by a local judge acting on the 1979 Bern Convention which "forbids the capturing, caging, or selling of the wild birds of Europe" (ratified by Italy in 1982). In past years, encouraged by LIPU and other groups, and armed with an official ban, police confiscated caged sparrows, mistle thrushes, song thrushes, terns, skylarks, blackbirds, fieldfares, and starlings from vendors at the Fiera. (In 1987, for example, 3,500 birds were taken in less than two hours.) And most recently, the Fiera itself has been officially abolished in Florence.



Persecuted by hunters and trappers throughout Italy's history, songbirds have also been, ironically, venerated in religious paintings. Far left, Jesus and St. John hold a European goldfinch in this Italian Baroque painting, La Madonna col Bambino e San Giovannino, *from the School of Sigismondo Coccapani. Above, another view of songbirds in an 18th-century still life by Luis Melendez.*

Not surprisingly, this and other efforts of conservation and protection groups are often ill received by the more intolerant among the hunters. They sometimes look upon bird watchers as busybodies with too much time on their hands, or as layabouts who would do better to go out and get a "real job," rather than harassing hunters. They may also label them as unflattering *guardone,* that is, as voyeurs, not simply watchers, and they occasionally see them as serious threats to their well-being, therefore deserving discouragements like having their dogs killed, their tires punctured, or their cars burned. This type of hunter sees little of value in the pro-bird campaign.

To the interference with the Fiera degli Uccelli, for example, some hunters have responded strongly, challenging the reading of the law and decrying the loss of a Florentine tradition "reaching all the way back to the Medici." They have since made plans to revive the Fiera in an area outside the city limits where protected wild birds will not be sold, but where the equipment for trapping them probably will be. Birders may be



relieved that the anachronistic cruelties practiced at the Fiera are now officially outlawed, but the struggle continues.

Other hunters, however, share some of the bird watchers' sentiments. Expressing a will to "live with other species of animals," they agree to spare rare or endangered species, or they set up centers for the care of wounded birds. Sometimes bird watchers and hunters find themselves allied—in conflict with business interests. In Florence, both groups worry about the construction of another runway at the little Peretola Airport in nearby Sesto Fiorentino, the city's only landing spot. For different reasons, both are resisting the laying out of a runway over one of the few remaining wetlands of Tuscany and one of the important links in a watery chain running the length of Italy. Recently, a metropolitan park has been established in the area, with plans for a variety of public uses, including a new runway. But a LIPU proposal for creation of a natural oasis has also been accepted. In the midst of "a thousand difficulties," according to a LIPU spokesman, the claims of the airport, of the birds, of the hunters, and of the bird watchers, are being heard. All share an interest in this precious piece of wetland.

It was with members of the Florence branch of LIPU that I witnessed this birder-hunter alliance firsthand. I visited the disputed site near the airport, at Osmannoro, now a mostly industrial and commercial zone with a small stretch of reedy marsh precariously surviving within its dusty, chain-linked boundaries. On one of the best of the flowery April days, our host, a khaki-clad hunter, led us into an enclosure rented and maintained specifically for hunting. Armed with bird books and binoculars, we passed through their rustic shed, disturbing slightly the dog-eared hunting magazines strewn across a tipsy table. Just outside the shed and snuggled up to a low fence was a contented nesting mallard. The juxtapositions were unsettling.

At the blind, I placed my elbows on the gun rest to steady my binoculars. Here, the bird watchers and the hunter helped me to identify at least 30 species of birds, among them shoveler, grey heron, greylag goose, whooper swan, whiskered tern, great white egret, little ringed plover, and others known to be breeding there—little bittern, sand martin, and night heron. Nesting great reed warblers chorused from the grassy periphery. The trim "cavaliere d'Italia" (black-winged stilt) in its parade black and white, with long red legs for boots, strutted among the ducks and egrets as if on troop inspection.

Within an hour I added a small flock to my life list, and I found myself hoping that this slim tract might resist the press of the great urban center so perilously near. As planes dipped low to the already existing runway and as a lifting helicopter drowned out the rattle of the frogs and the song of the warblers, I wondered if any balance could be achieved. In the local newspaper, one supporter of a larger airport for Florence ridiculed the use of such vital real estate as a "duck pond." So much for both the hunters and the bird watchers.

As they all grumbled in unison about Florence's ever-widening grasp, I lingered at the gun rest, looking across the marsh, across the airport runway, across the north Florentine flatness. Through the haze, the Duomo, one of humanity's most glorious achievements and one of Italy's most alluring tourist attractions, emerged with imposing clarity.

The hope of both the concerned hunters and the birders is that Italy will be able to preserve her natural inheritance. It is, after all, the land of Dante, whose descriptions of birds are among his most vivid, as in the line of lustful sinners who "like cranes, chant their lamentations, striking through the air in a long row, a trail of their errors." It is the land of Giotto, whose Assisi frescoes bring to life St. Francis' alliance with the birds; of Paulo Doni, called "Uccello" because of his love for birds; of Gozzoli, who in his paradise fresco at the Medici palace paints a special corner for the birds; and of Cellini, said to have captured birds to give himself the pleasure of releasing them.

Some of the signs are good. Support for conservation and preservation is rising, numbers of hunters are decreasing, membership in LIPU is growing, and among the younger generation of hunters are many who are more sympathetic to the birds' interests than were the young gunners on the boat from Capraia. But as Sandro Sacchetti, head of Florence's LIPU, acknowledges, "The trouble is, we really don't know how much time we have."

At another site in Sesto, also threatened by industrial expansion, Sandro helped me to spot a little grebe and two rare white-winged terns coasting low in graceful and intertwining circles. Sedge warblers, fan-tailed warblers, and white-throats sang from the reeds and low brush on our side of the marsh.

With a random sweep of my binoculars, my heart jumped when I spotted a twiggy tree literally sagging with birds of many shapes and sizes. It was so laden that it could have served as one of those "identi-trees" silhouetted in bird guides or painted on tea towels. My excitement was ill-founded. All of these birds were decoys, set strategically to lure their own kinds into gun range. There wasn't a breathing bird among them. ■

Ann Taylor is a freelance writer and English professor at Salem State College in Salem, Massachusetts.

At left, Giotto's 14th-century fresco of St. Francis preaching to the birds again depicts an Italian tradition perhaps as old as hunting . . . using birds as positive symbols in art and literature. Will this tradition, along with a growing conservation movement, eventually curtail the destruction of so many birds? Probably, but the changes may come too late to help some species.

THE GREAT DEBATE

by Pete Dunne

In a recent issue of a popular national birding club newsletter, members attempted to resolve one of the great aviasophical debates of our time: Do "heard only" birds count? Respondents were hopelessly divided on the issue, leaving me troubled and no closer to a resolution of . . . my own problem.

Reverently, I reached for my life list, running a finger down the ranks of sight-sanctified entries. I was feeling good, feeling proud, feeling pure-at-heart . . . until my finger came to rest upon the cold, dark blemish on my list and upon my soul.

The black rail! Tallied there among the other entries even though it was no more than a *kick-ee-doo* in the night.

Propelled by anxiety and guilt, I decided to take my moral dilemma down to the Cedarville diner to invoke the wisdom of the town worthies. Here, every morning at seven, the world's problems are laid out beside eggs over easy and hash browns. Here they are thoughtfully chewed and digested, and judgment is passed.

Certainly, I reasoned, people who can tell George Bush how to fix the economy and Lee Iaccoca how to build his pickup trucks to run like Fords should be able to tell me something as simple as whether heard birds should count.

"Count fer what?" Bob Henschel, a local dairyman, demanded.

"You know," I said, "count."

"They can count on me to dust their tails with shot if they don't stay out of my grapes," observed Phil Sayre, one of the county's most respected farmers.

"Look at the lilies of the field and the birds of the air," the Reverend John C. Johns intoned, forking a chunk of hash browns into his mouth, using the silence to dramatize his somewhat oblique point, "they do no work yet the good lord provides for them."

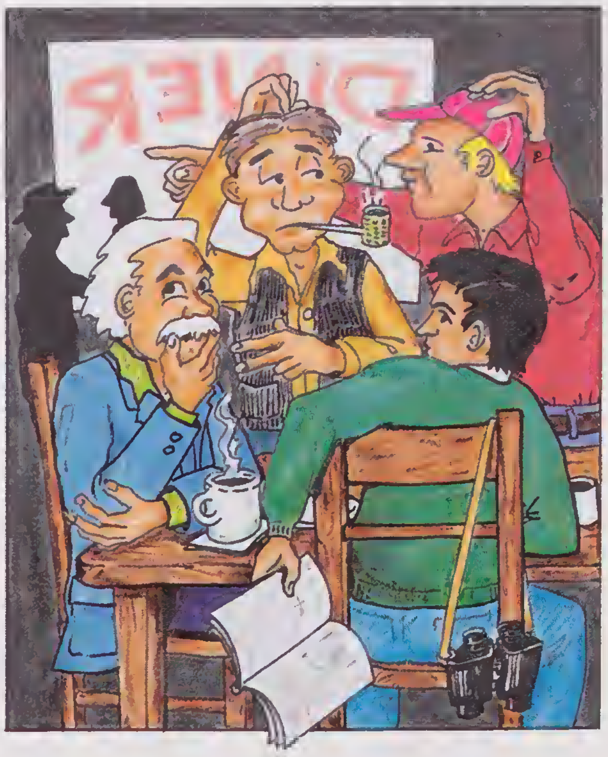
"That's a fact," Phil said. "Near as I can tell they don't work a lick—just sit in my fields and steal my crops."

"Excuse me, fellas," I interrupted, "but you don't understand. What I mean is, do heard birds count?"

"Nope," Bob Henschel said flatly. "Been raising cows all my life and never known them brown-headed herd birds to account fer nothing."

I took a deep breath, but it was Alan Corson, bayman and four-term mayor, who spoke up first.

"Henschel," he said, "you're gettin' dumber than them cows you tend. He don't want to know whether birds count fer something, he wants to know whether birds can count, like ciphering figures. An' I don't know 'bout other birds, but I can tell you fer a fact that ducks can count cause as soon as I shoot my limit, the rest of 'em just swarm all over my decoys."



"Course they can count," Phil added in agreement. "If birds couldn't count, what'd be the sense of getting in a group. Might as well stay by yourself—and listen, Mister, how come you keep sayin' herd? I thought a mess o' birds all together was called a flock."

"You're right," I affirmed, thinking that maybe we were making progress now, "flock. But I'm not interested in birds counting; I'm interested in counting birds—like in a list. What I want to know is can you count a bird on a list if you just hear it or do you have to see it, too?"

"Oh," four voices intoned, as four sets of eyes went flat and unfocused—and it is a credit to how seriously this ad hoc assembly takes the problems of the world that not one of them asked "what for?" (although it must have occurred to them).

"But of course they count," Reverend John said, recovering first. Metaphysical matters were his specialty and besides, if people stopped putting credence in what they heard, he'd be out of a job. "Remember that God spoke to Moses, who listened and took his people out of Egypt."

Bob and Alan nodded, but Phil didn't buy it.

"Now hold everything, Reverend. God backed up his audio with some pretty nifty special effects—burning bushes and believable stuff like that. I say a man just can't go along believin' everything he hears. He does that, why, he'll end up buyin' newspapers over the phone or votin' Democratic or sumthin'. I say a man can't never count on sumthin' he don't see with his own two eyes, includin' birds."

The Reverend leapt to a rebuttal but his argument was cut off short by a snarl from waitress Shirley Dockerty, who let it be known that she'd been handing the lot of them very legible bills for 15 years and not one of them had managed to count out the right amount of change yet.

Then another patron wanted to know whether "bills" were the same as "beaks?" Then some guy named Arty started to describe this bird "with a real long neck . . . ."

I stuck around until John and Phil started arguing about the tree that falls in the forest—and whether you have to see the tree that falls (even though you aren't there to hear it) in order to prove that it was a tree that did (or did not) make a sound. Then, with no one taking any particular notice, I said "thank you" and "goodbye," and went home to shred my checklist. ■

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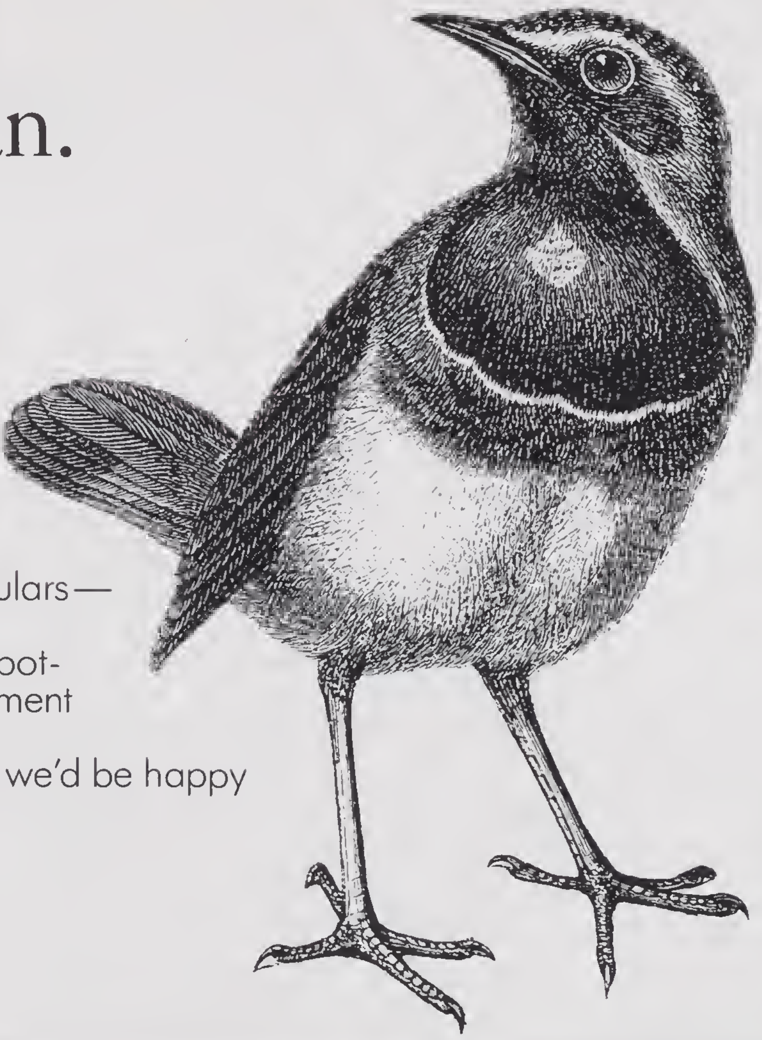

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